

NEW AMERICAN SUPPLEMENT

TO THE LATEST EDITION OF THE

ENCYCLOPÆDIA BRITANNICA

A STANDARD WORK OF REFERENCE IN

ART, LITERATURE, SCIENCE, HISTORY, GEOGRAPHY
COMMERCE, BIOGRAPHY, DISCOVERY
AND INVENTION

EDITED UNDER THE PERSONAL SUPERVISION OF

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Formerly Professor of English Literature and History, Kansas State University, etc., etc.

ASSISTED BY A CORPS OF EXPERIENCED WRITERS

ENRICHED BY MANY HUNDRED SPECIAL ARTICLES CONTRIBUTED BY MEN
AND WOMEN OF INTERNATIONAL REPUTATION

Illustrated with over Fifteen Hundred Portraits and Other Engravings

IN FIVE VOLUMES
VOLUME IV

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M

MALACCA—MALICIOUS PROSECUTION

MALACCA. See STRAITS SETTLEMENTS, Vol. XXII, p. 587.

MALACOSTRACA. See CRUSTACEA, Vol. VI, pp. 653-662.

MALAKOFF, a Crimean fort taken by the French troops, Sept. 8, 1855. See FORTIFICATIONS, Vol. IX, pp. 457, 458, and MACMAHON, in these Supplements.

MALAGHETTA. See AFRICA, Vol. I, p. 269.

MALAN, CÆSAR HENRI ABRAHAM, a Swiss Protestant clergyman, born in Geneva, July 8, 1787. He was a pastor of a state church, but came under the influence of Trinitarians, whose views he embraced and through whose influence he established himself in an independent church in Geneva. He is best known on account of his hymns, of which he composed a great many. Among his publications are *The Church of Rome* (1844); *Stories for Children* (1852); and *Pictures from Switzerland* (1854). His principal collection of hymns is *Chants de Zion* (1826). He died May 8, 1864.

MALAR LAKE. See SWEDEN, Vol. XXII, pp. 736, 737.

MALAYAN LANGUAGE. See TAMILS, Vol. XXIII, pp. 42, 43.

MALCOLM. See SCOTLAND, Vol. XXI, pp. 482, 483.

MALCOM KHAN, PRINCE NAZEM UD DOWLEH, a Persian statesman; born in Isphahan, Persia, 1832. In 1872 he occupied a post second to Grand Vizier. In this capacity he introduced many reforms, and in consequence was created Nazem ud Dowleh, one of the highest ranks in the land. After accompanying the Shah on his visit to Europe, he became Persian minister successively at London, Berlin, Vienna and other countries; and was sent as Persian Plenipotentiary to the Congress of Berlin, 1878. In 1889 he resigned his London embassy on account of personal differences with the acting Grand Vizier, and retired to private life. He devoted a great portion of his time to modifying the Arabic alphabet and improving the system of public instruction.

MALCZEWSKI, ANTON. See POLAND, Vol. XIX, p. 304.

MALDEN, a city of Massachusetts, on the Boston and Maine railroad. It was incorporated as a city in 1882. The Boston Rubber Shoe Company situated here has the largest factory of the kind in the United States. Other manufactures are cords, emery paper, leather, lasts, boot-trees and carpets. Combined capital of industries reporting in 1890, \$7,000,000; value of annual products, \$8,700,000. The public library has 28,000 volumes. It has electric lights and electric street-railway. Population 1890, 23,031; 1895, 29,708. See also MALDEN, Vol. XV, p. 327.

MALET, SIR EDWARD BALDWIN, a British diplo-

matist; born in The Hague, Oct. 10, 1837. He was educated at Eton, and at Corpus Christi College, Oxford, and entered the diplomatic service in 1854. During the Commune he was *chargé des archives*, was made Commander of the Bath, July 10, 1871, and promoted to be secretary of legation at Pekin in August of the same year. From 1873 to 1875 he was acting *chargé d'affaires* at Athens, and then proceeded to Rome as secretary of embassy. On April 20, 1878, he was appointed minister plenipotentiary at Constantinople, in the absence of the ambassador. The following year he went to Egypt as agent-consul-general, and a minister plenipotentiary in the diplomatic service; was made Knight Commander of the Bath in 1881, and received the medal and Khedive's star for his services in Egypt in 1882. In August, 1883, he was promoted to be envoy extraordinary and minister plenipotentiary at Brussels, and ambassador at Berlin, Sept. 20, 1884. Sir Edward Malet was sworn a Privy Councillor in March, 1885, and in June of the same year was decorated with the Grand Cross of St. Michael and St. George.

MALHEUR, a river of eastern Oregon, rising in Harney County, by several branches, and flowing E.N.E. to the Snake River on the state boundary near lat. 44° 4' N.; length, about 175 miles.

MALHEUR LAKE, a body of water without an outlet, in Harney County, Oregon, from ten to eighteen miles in diameter. It receives the waters of Silvies River and of Dunder and Blitzen River.

MALIBRAN, MARIA FELICITA, a French mezzo-soprano singer; born in Paris, March 24, 1808; the daughter of Manuel Garcia, a Spanish singer and teacher of singing. When she was still very young, her reputation extended over Europe. Her father attempted to establish the Italian opera in New York, but without success. She married M. Malibran, a Frenchman, who soon became bankrupt, and she went again upon the stage and was received with great enthusiasm in France, England, Germany and Italy. Her first marriage having been dissolved, she married M. Beriot, a famous violinist, in 1836; but on September 23d of that year she died at Manchester, whither she had gone to take part in a musical festival.

MALIC-ACID SERIES. See CHEMISTRY, Vol. V, p. 571.

MALICE, in law. See CRIMINAL LAW, Vol. VI, p. 588; LIBEL AND SLANDER, Vol. XIV, p. 506; MURDER, Vol. XVII, pp. 52, 53; and TORT, Vol. XXIII, p. 454.

MALICIOUS PROSECUTION, an unwarrantable criminal prosecution made by one person against another. Persons guilty of malicious prosecution are answerable in damages to the person against whom the prosecution was directed. In order to sustain an action for damages resulting from

malicious prosecution, it is necessary that the proceedings complained of shall have been regular and before a tribunal authorized to inquire into the charge made and punish the supposed offender. The plaintiff must show affirmatively that he was prosecuted by the defendant, that he was discharged in the final determination of the suit, and that the prosecution conducted against him was malicious and without probable cause. The jury may award exemplary damages as a punishment for the offense. See also TORT, Vol. XXIII, p. 454.

MALIGNANT PUSTULE. See WOOL-SORTERS' DISEASE, Vol. XXIV, p. 663.

MALINCHE OR MALINTZIN MOUNTAIN. See TLAXCALA, Vol. XXIII, p. 422.

MALINES OR MECHLIN, a town of BELGIUM; q.v., Vol. XV, p. 774.

MALLARD DUCK, the common wild duck (*Anas boschas*) of America and Europe. It is the original stock of most varieties of domestic ducks. In some countries it is known as "green-head." See DUCK, Vol. VII, p. 505.

MALLEABILITY. See METALS, Vol. XVI, pp. 64, 65.

MALLEE BIRD, the native pheasant of Australia. See MEGAPODE, Vol. XV, pp. 827, 828.

MALLERY, GARRICK, an American soldier and ethnologist; born in Wilkesbarre, Pennsylvania, April 23, 1831. He graduated from Yale, and took his degree in law at the University of Pennsylvania; practiced until 1861, when he entered the Union army as first lieutenant; rose to the rank of lieutenant-colonel, and was confined for some time in Libby prison. When the regular army was reconstructed he was made captain, with the brevet rank of lieutenant-colonel; served as judge-advocate to several generals, and was secretary of state in Virginia during the reconstruction period; was made brigadier-general in 1870; during this year he was detailed to meteorological service; in charge of the Weather Bureau for several years; placed in command of Fort Rice, Dakota (1876); detailed for duty in connection with the ethnology of the North American Indians in 1877; was retired from active service on account of wounds in 1879. He was placed in charge of the Bureau of Ethnology, in Washington, a post which he occupied until his death. He was, at various times, president of the anthropological section of the American Association for the Advancement of Science; vice-president of the main body; and president of the joint commission of the six scientific societies of Washington. Among his works are *A Calendar of the Dakota Indians* (1877); *Introduction to the Study of the Sign-Language Among the North American Indians, as Illustrating the Gesture-Speech of Mankind* (1880); *Photographs of the North American Indians* (1886); *Israelite and Indian, a Parallel in Planes of Culture* (1889); and *Picture-Writing of American Indians* (1893). He died in Washington, District of Columbia, Oct. 24, 1894.

MALLET, JULES THEODORE ANATOLE, a Swiss civil engineer; born in Geneva, Switzerland, in 1837. He graduated from the *École Centrale*, in France, in 1868; was connected with the work of

the Suez canal; edited the *Chronique* and the *Proceedings* of the Society of Civil Engineers of France after 1880. His most important work was the invention and improvement of compound locomotives. In 1886 he built the first articulated four-cylinder compound locomotive; received the Fourneyron prize of the Academy of Sciences in 1877, and the decoration of the Legion of Honor in 1885.

MALLEUS. See EAR, Vol. VII, pp. 591, 592.

MALLOCK, WILLIAM HURRELL, an English author; born in Devonshire in 1849; a nephew of James Anthony Froude, the historian. He was educated at Balliol College, Oxford, where, at his graduation in 1871, he gained the Newdigate prize for a poem entitled *The Isthmus of Suez*. He wrote *Every Man His Own Poet* shortly afterward, and in 1876 *The New Republic*, which attracted general attention from its being a satire on the confusion of modern thought, representative English people being brought forward in a realistic manner, the various persons being disguised but thinly under fictitious names. The book passed through several editions. *The New Paul and Virginia; or, Positivism on an Island*, appeared in 1878. He excited still further sensation in the critical world by his essay, *Is Life Worth Living?* (1879), which is often peevishly pessimistic in its conclusions, or, rather, its suggestions, the whole scheme of the work being dyspeptic rather than exhilarating, and giving vent to half-thoughts and splenetic utterances, which, if allowed to exercise the influence intended, would have a tendency to do quite as much damage by their subtleties as the realistic utterances and innuendoes of Zola do by their excessive frankness. Among his later works are *A Romance of the Nineteenth Century* (1891); *A Human Document* (1892); *In an Enchanted Island* (1892); *A Volume of Verses* (1893); and *The Heart of Life* (1896), this last work, a novel, being permeated by a strong, realistic portrayal of clerical life in England. Mr. Mallock's writings, from first to last, have met with severe treatment at the hands of the leading and most conscientious critics because of their morbid, and to some extent improper, tendencies.

MALLORY, GEORGE SCOVILLE, American religious editor, born in Watertown, Connecticut, in 1838, graduated as valedictorian at Trinity College, where he was afterwards Adjunct Professor of Latin and later Brownell Professor of English. He was for thirty-one years editor of the *Churchman*, which he made one of the most widely read religious journals in America. Died March 2, 1897.

MALLOPHAGA. See LOUSE, Vol. XV, pp. 24, 25.

MALLORY, STEPHEN RUSSELL, an American statesman; born in Trinidad, West Indies, in 1813. In 1839 he was admitted to the Florida bar, and became judge of probate, and in 1845 was appointed collector of customs at Key West. In 1851 he was chosen to the United States Senate, and continued to represent his state until 1861, when he resigned to take part with the Southern states. He was then appointed, by Jefferson Davis Secretary of the Navy, and held the post during the war. He was imprisoned after the war, but released on parole in 1866,

and pardoned in 1867. From 1866 until his death, Nov. 9, 1873, he practiced law at Pensacola, Florida.

MALMAISON, a chateau about $4\frac{1}{2}$ miles W. of Paris. It was purchased by Josephine in 1798, and during Napoleon's residence here at the time of the consulate, was embellished and much enlarged. At her death in 1814, it passed to her son Eugène Beauharnais, and Napoleon stayed five days here after his defeat at Waterloo. It was purchased in 1826 by a Swedish banker, and reduced to its original size; in 1842 it came into the possession of Queen Maria Christina of Spain; and in 1861 it was acquired by Napoleon III at a cost of \$300,000. He restored its paintings and works of art, and added many memorials of Napoleon and Josephine.

MALMSEY. See **WINE**, Vol. XXIV, p. 609.

MALONE, a post village and the capital of Franklin County, northeastern New York, 62 miles W. of Ogdensburg, on the Salmon River, and on the Central Vermont Railroad. It is the center of a large agricultural and lumber region, and manufactures woolen goods, paper, flour, tanned leather, men's clothing, and has foundries and machine-shops. The principal products of the vicinity are hay, hops, potatoes and dairy products, and in these and its manufactured goods it has a considerable trade. Population 1890, 4,986.

MALOT, **HENRI HECTOR**, a French novelist; born at La Bouille, France, May 20, 1830. He was educated for the law, but turned his attention to literature; served under Didot on *Biographie Générale*, and wrote for *Journal pour Tous*. He gradually drifted to novel-writing, and in 1859 began a series, *Les Victimes d'Amour*, with *Les Amants*. The series was closed in 1866 with *Les Enfants*. His plots are laid, for the most part, in the time of the second empire. One of his most popular books is a story of children, *Sans Famille* (2 vols., 1878), crowned by the French Academy. He wrote over fifty volumes; among them being *Un Beau-Frère* (1869); *Un Curé de Province* (1872); *Les Batailles du Mariage* (1877); *Baccara* (1886); *Séduction* (1887); *Justice* (1890); and *Complices* (1893), translated into English and published in America under the title of *A Story Without a Moral*.

MALPLAQUET, a village. See **FRANCE**, Vol. IX, p. 582.

MALPRACTICE, the unskillful or wrongful practice of a physician or other person by means of which the health of the patient is injured. Willful malpractice occurs when the physician willfully administers medicine or performs an operation which he knows will result in injury or death. Criminal abortion is an example of willful malpractice. Negligent malpractice occurs when medicines are administered or operations performed so carelessly that injury results, or when, through gross negligence, the patient does not receive proper care. Ignorant malpractice is the act of administering injurious medicines while ignorant of their evil effect, when a well-educated or competent physician would have known that the result would be injurious to the health of the patient. Malpractice is a misdemeanor at law, and the person injured may also

have a remedy by an action at law for damages sustained.

MALTA. The latest figures place the area at 95 square miles, and that of the neighboring island, Gozo, 20, making a total area (with Comins) of 117 square miles. Chief town and port, Valetta, strongly fortified, and with a population of about fifty thousand. In 1888 there were a university, a lyceum and two secondary schools. The governor is appointed by Great Britain; salary, \$25,000. Revenue in 1894, \$1,509,295; expenditures, \$1,458,410. The imports and exports, which in 1891 were about \$175,000,000 each, had fallen in 1894 to about \$65,000,000 each. Population 1894, 170,265. See also **MALTA**, Vol. XV, pp. 339-343.

MALTHEIDÆ, the family of bat-fishes. The best-known member of the family is *Malthe vespertilio*. This fish is shaped curiously, the fins resembling frog legs. It lives in the water near the West Indies. Economically it is of no importance.

MALVACEÆ. See **MALLOW**, Vol. XV, p. 335.

MALVERN, a town and the capital of Hot Springs County, southwestern central Arkansas, 43 miles S.W. of Little Rock, on the St. Louis, Iron Mountain and Southern railroad, at the junction of the Hot Springs railroad. It is in a cotton, grain and fruit raising region, and has cotton-gins and grist-mills. Population 1890, 1,520.

MALVERN, a town of Mills County, southwestern Iowa, 24 miles S.E. of Council Bluffs, on Silver Creek, and on the Chicago, Burlington and Quincy and the St. Louis and Omaha railroads. It is the trade center of a large grain, stock, and vegetable raising region. It has a commercial college, water-works, electric lights, a large cold-storage house, grain-elevators, a creamery, and brick and tile works. Population 1895, 1,091.

MALVERN HILL, **BATTLE OF**, the last and fiercest of the "Seven Days' Fight" took place, July 1, 1862, at Malvern Hill, a town in Virginia, near the James River, about 15 miles southeast of Richmond. Here McClellan held a strong position on the top of a plateau, protected on one side by a steep ravine which was under fire of the gunboats on the Potomac, and on the other by long slopes up which Lee's army would be compelled to charge. Batteries were planted so as to command the slopes, and the troops were entrenched strongly behind fences, ditches and hedges. Lee ordered a charge by all parts of his line, but they were so far apart that the signal was not heard, and the attacks consequently were not in concert. Hill and Magruder bore the brunt of the fight, but were beaten off by the artillery-fire. Time after time they charged, but to no purpose. The battle lasted until nightfall, when McClellan retired to Harrison's Landing, where he restored communications. The Federal loss was less than half that of the Confederates.

MAMARONECK, a town of Westchester County, southeastern New York, 22 miles N.N.E. of New York City, on Long Island Sound, and on the New York, New Haven and Hartford railroad. It is a residence town for city business men, and contains many handsome residences. Population 1890, 2,385.

MAMELUKES OR MEMLUKS. See EGYPT, Vol. VII, pp. 755-764.

MAMIANI DELLA ROVERE, COUNT TERENCE, an Italian scholar and statesman; born in 1799, at Pesaro, in the Romagna. He took a prominent part in the futile outbreak at the accession of Gregory XVI, and was compelled to flee to Paris, whence he returned to Rome in 1848 after the unconditional amnesty of Pius IX, and actually held office for three months in the Papal ministry. He next withdrew to Turin, where he founded his society for promoting Italian unity. On the flight of Pius IX from Rome to Gaeta he re-entered the political arena and was for a short period Foreign Minister in the Cabinet of Galetti. On the fall of Rome he retired to Genoa; in 1856 he was a member of the Sardinian Parliament, and in 1860 entered Cavour's ministry as Minister of Instruction. He was appointed ambassador to Greece in 1861 and to Switzerland in 1865. He did some work in poetry, and wrote the following philosophical works: *Rinnovamento della Filosofia Antica Italiana* (1834); *Le Confessioni di un Metafisico* (1865); *Psicologia di Kant* (1877); *Critica della Rivelazioni* (1880); and *Questioni Sociali* (1882). He died at Rome, May 21, 1885.

MAMMARY GLANDS. See MAMMALIA, Vol. XV, p. 368.

MAMMEE APPLE, the delicious fruit of the West Indian *Mammea Americana*, a genus of the family *Guttifera*.

MAMUN. See AL-MAMUN, Vol. I, pp. 589, 590.

MAN. See MAMMALIA, Vol. XV, pp. 445, 446; and ANTHROPOLOGY, Vol. II, pp. 107-123.

MANAGUA LAKE. See NICARAGUA, Vol. XVII, pp. 477, 478.

MANAOS, the principal city and capital of the state of Amazonas, northwestern Brazil, in lat. 3° 8' 4" S., long. 60° 0' 12" W. It was originally a fort and Indian village of but little importance. Then it was made the capital of the new province. It is the center of river-navigation, and has a large rubber trade, its exports of this product being in 1891 about 25,000,000 pounds, but the average export does not exceed 10,000,000 pounds per annum. It also exports cacao, Brazil-nuts, dried fish and sarsaparilla. Ocean steamers can ascend the Amazon to this point, and its situation is favorable to rapid growth. It has some substantial public buildings, barracks, a library, schools, museum and meteorological observatory; and near the town is an industrial institution for the education of Indians. The city is healthfully located, and is supplied with water by an aqueduct half a mile in length. Population 1896, about 19,000.

MANASQUAN, a borough of Monmouth County, central eastern New Jersey, 12 miles S. of Long Branch, on the Pennsylvania railroad, and on the Manasquan River. It is a summer resort, and is within a mile of the ocean. Population 1890, 1,506; 1895, 1,427.

MANASSAS JUNCTION, BATTLES OF. See BULL RUN, in these Supplements.

MANASSEH BEN ISRAEL, a Jewish scholar; born at Lisbon in 1604; fled with his father from

the Inquisition, and settling at Amsterdam became chief rabbi at the synagogue there. He believed that the Messianic time was at hand and that the ten lost tribes had been found in America. In 1656 he visited England, seeking to secure from Cromwell the readmission of the Jews. He published texts of various parts of the Old Testament, with notes. His various publications served to pave the way for the gradual return of the Jews to England. He died at Middleburg in 1659.

MANBY, GEORGE W. See LIFEBOAT, Vol. XIV, p. 572.

MANCHESTER, a manufacturing town of Connecticut. Its activity has increased considerably since 1880. It now makes dynamos, generators, motors and incandescent lamps, woolen goods, needles and various fabrics. The Cheney silk-mills give employment to 2,000 hands. The town is lighted by electricity, and has water and sewer systems, and also a high school library. Population 1890, 8,222. See also MANCHESTER, Vol. XV, p. 465.

MANCHESTER, a city and the capital of Delaware County, northeastern Iowa, 42 miles W. of Dubuque, on the Maquopeta River, and on the Illinois Central railroad. It is in a farming and dairying region, and has water-power and a machine-shop, woolen and flour-mills and a mower factory. It has a public library and reading-room containing 9,000 volumes. Population 1890, 2,344; 1895, 2,683.

MANCHESTER, a village of Washtenaw County, southeastern Michigan, 18 miles E.S.E. of Jackson, on the Lake Shore and Michigan Southern railroad. It is in a fruit and grain raising region, and contains large roller-process flour-mills, planing-mills, foundry and machine-shops, a brewery, book-publishing and stationery manufacturing house, a refrigerator factory and an electric-light plant. It also has mineral springs. Population 1895, 1,162.

MANCHESTER, a city of New Hampshire. Its industries, as reported to the Census Bureau in 1890, had an aggregate capital of \$21,000,000, and produced \$19,000,000 worth of goods annually. They employed over 14,500 hands. The water-power gained from the river is controlled by the Amoskeag Manufacturing Company. The four largest fabric mills have an aggregate of 480,000 spindles, 15,800 looms, and turn out 280 miles of cloth per day, including sheetings, drillings, ginghams, denims, tickings, seamless bags, etc. The city contains a State Industrial School, hospital, eight grammar schools and a training school for teachers. The public library contains over 32,000 volumes. Population 1890, 44,126. See also MANCHESTER, Vol. XV, p. 465.

MANCHESTER, a post village of Adams County, central southern Ohio, on the north bank of the Ohio River, 40 miles below Portsmouth. It is a shipping-point for farm produce, and has manufacturing of flour, lumber and furniture. Population 1890, 1,965.

MANCHESTER, a town and one of the capi-

tals of Bennington County, southwestern Vermont, 32 miles S. of Rutland, on the Battenkill River, and on the Bennington and Rutland railroad. It was one of the first settled towns in the state, is picturesquely situated amid mountain scenery, and is a summer resort. It is the seat of Burr and Burton Seminary and of a classical school for both sexes. It has mineral springs of value. Population 1890, 1,907.

MANCHESTER, a city of Chesterfield County, east-central Virginia, on the south bank of the James River, opposite Richmond, on the Atlantic Coast Line and the Southern railroads. It is in an agricultural and coal-mining region. It is a manufacturing town, producing flour, cotton, castings and paper. It also has railroad-car shops. In the vicinity are several large granite-quarries. Population 1880, 5,729; 1890, 9,246.

MANCHESTER, an English city (for general article on which, see MANCHESTER, Vol. XV, pp. 459-465). The Parliamentary borough of Salford is now virtually a part of Manchester, communication between the two being obtained by the numerous bridges crossing the river Irwell. Manchester, with Salford, covers an area of about 13,000 acres. The population of Salford in 1891 was 198,139, the estimated population in 1895 of the municipal borough being 208,253; the population of Manchester in 1891 was 505,368, and of the municipal borough (estimated, 1895), 524,865. The population of Manchester, in a geographical sense, including the registration districts of Salford, Prestwich, Barton and Chorlton, and the subdistricts of Heaton Norris, Altrincham, Wilmslow and Hyde, was, in 1891, 999,000. The Parliamentary borough of Manchester contains six divisions, while the Parliamentary borough of Salford contains three divisions, each division returning one member.

The new Manchester Post-Office, in the Renaissance style, was completed in 1887 at a cost of \$500,000. Potter's Park was presented to Manchester by the late Sir Joseph Whitworth and opened in 1889. The new race-course at New Barns is one hundred acres in extent, and has a grand stand capable of seating 2,700 spectators. Owens College, Manchester, was affiliated with Victoria University (founded 1870), and now occupies an extensive site of buildings, erected in 1884 at a cost of \$350,000, with an additional block of buildings erected in 1887. In 1894 a considerable extension to the medical department was inaugurated. The Whitworth Institute was founded in 1888, and to it was transferred, in 1890, the technical school, the whole being devoted to technical instruction.

The Manchester Unity Friendly Society had, in 1894, an adult membership of 739,449, with 96,453 juvenile members. The total capital of the order is \$45,300,000. In 1893 it was voted to admit females to membership.

In Manchester and Salford there were, in 1894, over 360 places of worship of various sects; about 120 of these belonged to the Church of England

and five were Jewish synagogues. The diocesan population of Manchester is 2,644,424.

The 17 banks in Manchester and Salford showed, in 1894, a clearing-house turn-over of \$807,500,000.

The water-works, gas-works and tramways belong to the corporation, the last being leased to a company.—*Water-works.* The works for the purpose of conveying water from Thirlmere, a distance of about one hundred miles, were commenced in 1885, carried out at a cost of \$20,000,000, and formally inaugurated Oct. 13, 1894. The water is conveyed by tunnels and aqueduct to the neighborhood of Bolton and thence by pipes to Manchester. The daily supply is estimated at 50,000,000 gallons.—*The Manchester Ship-Canal.* The act of Parliament authorizing this undertaking was passed Aug. 6, 1885, and had for its purpose the connecting of Manchester with the sea by means of a canal capable of transporting the largest merchant steamers. The canal commences at Eastham, on the south shore of the Mersey, and extends by way of Runcorn and Warrington to Trafford bridge, Manchester, a distance of 35 miles, where docks covering 85½ acres were constructed. The total length of quays is six miles. The minimum depth of the canal is 26 feet, with a bottom width of 120 feet. The level of the docks at Manchester, 60½ feet, is reached by four sets of locks, each set comprising three locks, which are capable of being worked together. It takes eight minutes to accomplish the passage through a lock, the whole transit of the canal being made in eight hours. The canal is sufficiently wide to accommodate the Bridgewater and Runcorn canals, the former being carried over the ship-canal, with a swing aqueduct for the passage of vessels. The total cost exceeded \$50,000,000. It was opened by her Majesty the Queen, May 24, 1894. See also CANAL, in these Supplements.

MANCHESTER NEW COLLEGE, a theological school at Oxford, England, but not connected with the university. It is a successor of the Warrenton Academy, and received its first class as Manchester Academy in 1786. It was moved to York in 1803, returned to Manchester in 1840, transferred to London in 1853, and to Oxford in 1889. At Oxford it was housed in new buildings, erected at a cost of \$275,000 and formally opened in 1893. Since then the institution has been called Manchester New College. It is supported mainly by Unitarians for the education of ministers, without restriction as to the sect in which they will minister.

MANCHESTER SHIP-CANAL. See CANAL and MANCHESTER, in these Supplements.

MANCHINEEL (*Hippomane mancinella*), a tropical American tree of the family *Euphorbiaceæ*, celebrated for the poisonous properties of the acrid milky juice with which every part of it abounds. A drop of this juice, which is of a pure white color, burns like fire if it falls upon the skin, and the sore which it produces is very difficult to heal. The Indians of tropical America

use it for poisoning their arrows. The fruit is not unlike a small apple, and the wood is well suited for cabinet-making.

MANCINI, PASQUALE STANISLAS, an Italian statesman; born at Ariano in 1817. After graduating at Naples he became professor of jurisprudence there. As a member of the Neapolitan Parliament he opposed the King, and in 1848 was obliged to flee to Turin, where he became professor of international law. In 1860 he became Minister of Justice and Religion in the new Italian government. He was a leader of the Liberal party in the first Italian Parliament in 1861, and in the next year was also Minister of Education, and from 1876 to 1878 was Minister of Justice. While minister he abolished capital punishment, except in case of parricide or regicide. Mancini resided at Rome, where he was professor in the university, as well as Deputy in Parliament. He published *Diritto Internazionale* (1873); and *Projet de Code Pénal Unique* (1877). He died at Naples, Dec. 26, 1888. See also under GIANNONE, Vol. X, p. 571.—His wife, LAURA BEATRICE OLIVA MANCINI (1823-69), was a noted poetess. Many of her poems had reference to the political condition of Italy.

MANCO CAPAC, first Inca of Peru. See AMERICA, Vol. I, p. 698.

MANDAN, a city and the capital of Morton County, central southern North Dakota, about five miles W. of Bismarck, on the Northern Pacific railroad, and on the Missouri River, where it is joined by the Heart. It is in a stock-raising and coal-mining region, and ships much wool. Located here are railroad-car shops, a sash and wood-working factory and flour and feed mills. It is the seat of the state reform school. Population 1890, 1,328.

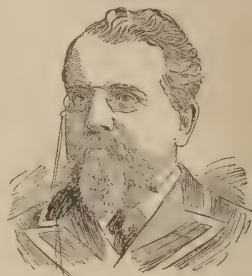
MANDANS, a small tribe of North American Indians, living on a reservation of 8,640,000 acres, in the basin of Yellowstone and Powder rivers, in western South Dakota and eastern Montana. An annual appropriation of \$75,000 is made for this tribe, together with the Hidatsa (Gros Ventres) and Arikara, who occupy the same reservation. Their number in 1895 was about 265. They are backward in civilization, although carrying on some agriculture. See also INDIANS, Vol. XII, p. 833.

MANDARA or WANDALA, a kingdom of central Africa, southeast of and tributary to Bornu, in lat. 11° N., long. 14° E. It is a large, fertile, well-watered and cultivated valley, inhabited by Mohammedan negroes, who are industrious in agriculture, weaving and iron-shaping. A fine breed of horses is raised here. The capital is Doloo, with 30,000 inhabitants.

MANDAVEE or MANDIVEE, the principal seaport town of Cutch, India, on the Gulf of Cutch, about 35 miles from Bhoj, or Bhuj. It is fortified, has an open roadstead, and an active trade with Sind, Malabar, the Persian Gulf, Arabia and the west coast of Africa as far as Zanzibar, besides a large inland trade. Its exports comprise cotton, silk and other piece goods. Its imports are bullion,

ivory, hides, dates, cocoanuts, grain and timber. Population 1891, 38,200. See also CUTCH, Vol. VI, pp. 730, 731.

MANDERSON, CHARLES FREDERICK, an American public man; born in Philadelphia, Pennsylvania, Feb. 9, 1837. He removed to Canton, Ohio, in 1856, and in 1861 entered the army. In 1865 he was brevetted brigadier-general of volunteers for meritorious services during the war. In 1869 he removed to Omaha, where he took up the practice of law. He was elected to the United States Senate, as a Republican, in 1882; was re-elected in 1888 for the term ending in 1895; and was president *pro tem.* of the Senate from 1891 to 1893.



CHARLES F. MANDERSON.

MANDOGARH or MANDU, a ruined city of India, formerly capital of the Mohammedan kingdom of Malwa, 15 miles N. of the Nerbudda and 38 S.W. of Indore. The ruins stretch for 8 miles along the crest of the Vindhya Mountains, and have a circumference of 37 miles. A deep, narrow valley separates them from the adjoining table-land. The least injured of the ruined buildings is the great mosque, which is reached by a handsome flight of stairs; it is said to be "the finest and largest specimen of Afghan architecture extant in India." There are also a massive royal palace and the white marble mausoleum of the king who raised the city to the acme of its splendor early in the fifteenth century. According to Malcolm, Mandogarh was founded A. D. 313.

MANDOLIN. See LUTE, Vol. XV, pp. 70, 71.

MANEESA. See MANISA, Vol. XV, p. 490.

MANET, EDOUARD, a French painter; born in Paris in 1833; the founder of "impressionism," an attempt to avoid such compromises and conventionalities of lighting, composition, etc., as have been frankly accepted by the art of the past, and to render with absolute truth the personal and immediate "impressions" of nature. He received a second-class medal at the Salon of 1881, and received the decoration of the Legion of Honor in 1882. His best pictures are *Olympia* (1865) and *The Boy with the Sword* (1861). He died in Paris, April 30, 1883.

MANGANESE MINERAL, A NEW. A hydrous sulphate of the Epsomite group discovered by Mr. Iles in Colorado in 1882. It is composed of loosely adhering, very friable, thick orthorhombic prisms, which frequently terminate in truncated pyramid, with a slightly glimmering luster. The aqueous solution effervesces with sodium carbonate and reddens blue litmus paper. Its hardness is from .75 to 1, and its specific gravity is 2.167. See also MANGANESE, Vol. XV, pp. 479-481.

MANGANESE STEEL. See IRON AND STEEL, in these Supplements.

MANGE, a disease. See VETERINARY SCIENCE, Vol. XXIV, p. 206.

MANGEL-WURZEL or MANGOLD-WURZEL. See AGRICULTURE, Vol. I, pp. 368, 369.

MANHATTAN, a city and the capital of Riley County, northeastern Kansas, 50 miles W. of Topeka, at the junction of the Big Blue and Kansas rivers, and on the Chicago, Rock Island and Pacific, the Manhattan, Burlingame and Alma and the Union Pacific railroads. It is in a fruit and stock raising region, and is noted for its magnesian limestone and cement. It has manufactories of boots, shoes, carriages, wagons and cigars, and has marble-works, an iron foundry, wind-mill and sash and blind factories. The Kansas State Agricultural College is located here. Population 1890, 3,004; 1895, 2,980.

MANHATTAN COLLEGE, an institution of learning for men, in New York City. It was founded in 1853, by the Roman Catholics, shortly after the arrival of the Brothers of the Christian Schools. The name Academy of the Holy Infancy was used first, but in 1863 the course of study was raised and broadened, and the school chartered and affiliated with the University of the State of New York, under the name Manhattan College. It has two main courses, the classical and the scientific. There is also a business course and the technical school, De la Salle Institute, is affiliated with it. It also is connected with several Roman Catholic schools throughout the state and in New England. The Alumni Association is the oldest Roman Catholic society of this kind in New York. There is no permanent endowment, but its income amounts to about \$64,000. The faculty, in 1895, numbered 26, the student body 650, and the volumes in the library about 8,500.

MANHEIM, a post borough of Lancaster County, southeastern Pennsylvania, 10 miles N.W. of Lancaster, on the Philadelphia and Reading and the Cornwall railroads. It has manufactories of flour, carriages, castings, cigars, mill machinery and lumber. Population 1890, 2,070.

MANIA. See INSANITY, Vol. XIII, p. 104.

MANID. See MAMMALIA, Vol. XV, p. 388.

MANIOC. See CASSAVA, Vol. V, p. 182.

MANISTEE, a city of Michigan. It is on the Manistee and Northeastern, the Manistee and Grand Rapids and the Flint and Pere Marquette railroads. It has several foundries, ten salt-works, and the city claims to have the largest vacuum-evaporating salt-works in the world, which in 1892 produced 6,295,000 bushels. It is in a great fruit-growing region. It is supplied with water by the Holly system, has electric lights and street-railways, and hospitals, industrial home, schools, etc. Population 1890, 12,812; 1894, 13,449. See also MANISTEE, Vol. XV, p. 490.

MANISTIQUE, a village and the capital of Schoolcraft County, central northern Michigan, 42 miles E.N.E. of Escanaba, on Lake Michigan, at the mouth of the Manistique River, and on the Minneapolis, St. Paul and Sault Ste. Marie rail-

road. It has manufactories of lumber, sashes, doors and blinds, and pig-iron. It has fishing interests, and is a summer and sportsman's resort. Population 1894, 2,083.

MANITOBA, the prairie province of the Canadian dominion, in 1870 was carved out of the domain of the Hudson Bay Company, then known as Rupert's Land, and locally as the Red River Settlement. Its shape is that of a parallelogram, and its area is 73,956 square miles, nearly 10,000 of which are water. Manitoba has had a rapid growth, its population having swelled from 18,995 in 1871 and 62,260 in 1881 to 152,506 in 1891. It has a railway service 1,500 miles in extent, and the facilities of steamboat communication on the Red River. The entire province having originally been the bed of a lake, its soil is very rich and productive. The wheat grown in the province is of a high grade, and the average yield is high, except in seasons when frosts have affected either the quantity or the quality. Potatoes and other root crops yield wonderfully. The climate of Manitoba is excessive, and this, with frosts occasionally blighting not a little of the harvest, is the drawback. The temperature ranges from 95° F. in summer to 30° and 40° below zero in winter. The mean rainfall is about 20 and the mean snowfall about 50 inches. Excessive as the climate is, it is, however, extremely healthful and bracing.

Farming is the great industry of the province, which combines, on its vast level plains, cattle-raising with the producing of cereals. Wheat and oats are the chief yield, with the addition of barley and potatoes. The area under cultivation of these crops in 1894 was, in wheat, 1,000,000 acres, in oats, 413,686 acres; in barley, 119,528 acres, and in potatoes, 13,300 acres. The yield for the same year was, in bushels: Wheat, 17,000,000; oats, 12,000,000; barley, 3,000,000; and potatoes, 2,000,000. The census returns for 1891 give the following as the total live-stock of the province: Horses, 86,753; horned cattle, 229,707; sheep, 35,816; and swine, 53,019. The increase is remarkable over the stock owned in the province in 1881, considering the, as yet, small occupied area. The estimated area of the province and the contiguous Northwest Territories is in the neighborhood of 230,000,000 acres. Of this vast tract, less than two million acres are under cultivation for wheat. The wheat-raising possibilities of these rich and extensive plains are therefore scarcely entered upon, and the same may be said of the scope and advantages of the region for the purposes of cattle-raising. The great drawback to prosperity is the want of population, a tariff that shall bear less hardly in its taxation upon agricultural implements, and freer access to the great markets of the continent. Of manufactures, Manitoba, so far, has little. In 1891 the total working capital of such establishments as she had did not exceed two and a half millions, and the value of the gross output was under eleven millions.

Manitoba has but one legislative chamber, of

forty members, five of whom are ministers of the crown, and four under a lieutenant-governor, the cabinet, or executive council. The province is represented in the Dominion Parliament by three Senators, and seven members in the Commons. Its revenue, the chief item being the Dominion subsidy of \$437,601, was, in the year 1894, \$636,000, a trifle in excess of the year's expenditure. The debt of the province, which was incurred mainly for railway aid and public works, was, in 1894, four and a half millions. Of the total population (152,506 in 1891), a small percentage was Indians and French-Canadian half-breeds. The total Indian population, including that of the adjacent Northwest Territories, was, in 1891, 23,708, more than half of whom have cultivated land holdings. The religious census of Manitoba in 1891 was as follows: Presbyterians, 38,977; Church of England, 30,852; Methodists, 28,210; Roman Catholics, 20,571; Baptists, 15,829; Lutherans, 6,548; and Congregationalists, 1,815.

Education in Manitoba was formerly under a board composed of two sections, one Protestant and another Roman Catholic; but by the act of 1890 this arrangement, together with the separate school system, was set aside, and a department of education established. The board consists of the provincial executive and an advisory council of seven members, four being appointed by the board of education, two by the public and high school teachers and one by the University of Manitoba. The validity of the act of 1890 has, however, been called in question and given rise to considerable litigation. The abolition of the separate or sectarian schools has been a disturbing element in the political atmosphere of the Dominion, especially outside the province, where French and Roman Catholic sticklers for separate religious schools are noisy and aggressive. The matter having been argued before the native courts, it then was referred to the Imperial Privy Council, which acknowledged the grievances of the minority in Manitoba and affirmed that the Federal Parliament had power to legislate. In March, 1895, the Dominion authorities called upon the Manitoba government to pass an act to relieve the Catholic minority; but Manitoba refused to comply with the request, insisting that the public schools of the province shall be non-sectarian, and that no religious exercises, except under certain conditions, shall be allowed therein. The controversy once more became a brand of political strife in the Canadian Parliament, and in 1896 the question was referred to the people at the polls, resulting in the overwhelming defeat of the Catholic party. The statistics of education in Manitoba for 1894 show that there are 884 schools in operation, with a school population of 36,459, and an average attendance of 16,260, or half the number enrolled. The number of teachers was 1,047, and the total amount raised for education \$455,000. The Dominion government holds, in trust, for the purposes of education, in Manitoba, two sections of land, 640 acres each, in every township. Some portion of these

lands, which for years had purposely been kept out of the market, in order to allow their value to increase, have been sold, netting an average of \$7.10 per acre.

The chief towns of the province are Winnipeg, the capital, which in 1881 had a population of 7,985, increased to 25,642 in 1891; Brandon, population in 1891, 3,778; and Portage la Prairie, population in 1891, 3,363. See also MANITOBA, Vol. XV, pp. 490, 491.

G. MERCER ADAM.

MANITOBA LAKE, a very large and irregular body of water in the province of Manitoba, Canada, lying between lat. 50° and 52° N., and between long. 98° and 100° W. It runs north-north-west, and is 120 miles long. Its greatest breadth is 30 miles, at its south end. Area, 1,900 square miles. It receives the White Mud River and the waters of Lake Winnipegosis through the Waterhen River. Its waters are discharged through St. Martin's Lake into Lake Winnipeg. Altitude 1,815 feet.

MANITOU, a summer resort at the base of Pike's Peak, El Paso County, central Colorado, 6,296 feet above the level of the sea. It is five miles W. of Colorado Springs, on the Colorado Midland, the Denver and Rio Grande and the Manitou and Pike's Peak railroads, the latter being a narrow-gauge cog-system mountain railway climbing to the summit of Pike's Peak. It is the Saratoga of the West, with soda and iron springs and many large summer hotels. The scenery is grand, among its most attractive features being Cheyenne Cañon, Ute Pass, Rainbow Falls, Cave of the Winds and the Garden of the Gods. Population 1890, 1,439.

MANITOULIN ISLANDS, a name given to the line of rocky islands separating Lake Huron from Georgian Bay and North Channel, and consisting of Great Manitowan, Little Manitowan, or Cockburn Island, and Drummond Island, the first two belonging to Ontario, the last to Michigan. The first and largest is eighty miles long and twenty broad, is very irregular, with innumerable bays, lakes and streams, and clad with forests of pine, spruce and cedar. Area, 1,600 square miles. The second, Cockburn, is seven miles in diameter. The third is 10 and 18 miles in its extreme diameters, and is a summer resort. None of the islands is fertile, but all are fine fishing-grounds. The Canadian islands contain about 2,000 inhabitants, of whom more than half are Algonquin Indians. The American island had, in 1894, 408 inhabitants, of whom 257 were natives.

MANITOWOC, a city of central eastern Wisconsin. It has regular steamboat connection with Milwaukee, and Ludington, Michigan. It has tanneries and edged-tool works, and has a subscription library. It also manufactures machinery, iron, flour, bricks and glue, having the only glue factory in the state. Population 1890, 7,710; 1895, 9,427. See also MANITOWOC, Vol. XV, p. 491.

MANIZALES, a town of central eastern Co-

lombia, at the extreme southern point of the department of Antioquia, 115 miles E. by N. of Bogotá, on a branch of the Cauca River, seven thousand feet above sea-level. It has an advantageous position on several lines of trade, being on a road leading from the upper Cauca to Antioquia, and near a pass in the Andes which affords an easy route to Bogotá. On account of its position it has been of great importance in the civil wars of the region. It has a large trade in cacao. It is surrounded by rich grazing and agricultural lands, there are hot springs near the city which are considered valuable medicinally, and from which water is conducted in pipes to the city. Population 1892, 14,603.

MANKATO, a city and railroad center of central southern Minnesota. It is situated in a flourishing and lumbering district, with several beautiful lakes in the vicinity. It manufactures pumps, plows, sewer-pipe, machinery, brick and lime, cement and fiber-ware. It has three national banks, a state normal school and a board of trade. Population 1890, 8,838; 1895, 10,173. See also MANKATO, Vol. XV, p. 491.

MANLIUS, a post village of Onondaga County, central New York, about 12 miles E. of Syracuse, on the West Shore railroad. It is the seat of St. John's Military school and contains manufacturing of paper, iron, flour, woolen goods and cement.

MANN, WILLIAM JULIUS, a German theologian and author; born in Stuttgart, Germany, May 29, 1819. He studied at Tübingen, Germany, and entered the Lutheran ministry in 1841, serving at Würtemberg until 1845, when he removed to America. He was pastor of several churches in Philadelphia, and had charge of Zion and St. Michael's from 1863 until 1884, when he retired as pastor *emeritus*. He was professor in Philadelphia Theological Seminary from 1864 to 1892. He was editor of the *Kirchenfreund* from 1854 to 1860, and contributed to various German theological magazines. Among his most important works are *Lutheranism in America*; *System of Christian Ethics* (1872); *The Lutheran Church and Its Confessions* (1880); *Life and Times of Henry Melchior Mühlenthal* (1887); and as associate on the *Hallesche Nachrichten* (1886). He died in Boston, June 20, 1892.

MANNA-LICHEN. See LICHENS, Vol. XIV, p. 560.

MANNERS, JOHN JAMES ROBERT. See RUTLAND, DUKE OF, in these Supplements.

MANNESMANN TUBE. See IRON AND STEEL, in these Supplements.

MANNING, a town of Carroll County, western central Iowa, 80 miles W.N.W. of Des Moines, on the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads. It is the trade-center of a grain and live-stock raising region. Population 1890, 1,233; 1895, 1,144.

MANNING, a town and the capital of Clarendon County, southeastern central South Carolina, 56 miles E.S.E. of Columbia, on the Atlantic

Coast Line railroad. It is in an agricultural and well-timbered region, and has turpentine distilleries and lumber-mills. Population 1890, 1,069.

MANNING, DANIEL, an American politician; born in Albany, New York, Aug. 16, 1831. Losing his father at an early age, he was compelled to support himself, and soon became connected with the Albany *Atlas*, a paper afterward merged in the Albany *Argus*. Working his way up from office-boy, through the composing-room to the reportorial and editorial staff, by 1873 he had secured control of the paper and had become president of the Argus Publishing Company. He was chairman of the Democratic State Committee from 1881 to 1884; was delegate to three national conventions, and chairman of the one in 1880. On the accession of Mr. Cleveland to the Presidency, in March, 1885, Mr. Manning was appointed Secretary of the Treasury. He held that office until April, 1887, when sickness compelled his resignation. He died in Albany, Dec. 24, 1887.

MANNING, HENRY EDWARD, an English Catholic cardinal; born in Totteridge, Hertfordshire, July 15, 1808. After graduating as double first at Balliol College, Oxford, in 1830, he was appointed, in 1834, rector of Lavington and Graffham, in Sussex, and in 1840 he was made archdeacon of Chichester. In 1851 he left the Church of England and joined the Roman Catholic Church. After studying for some years in Rome he was ordained



CARDINAL MANNING.

priest in 1857, and founded the congregation of the Oblates of St. Charles Borromeo, at Bayswater, London. On the death of Cardinal Wiseman in 1865, he was appointed archbishop of Westminster. Being a zealous supporter of papal infallibility, Dr. Manning was made a cardinal in 1875. He was the foremost spirit in all Catholic movements in England, organized many parochial schools, promoted temperance, started many benevolent societies among the poor, and took a lively interest in all practical reforms. He wrote *The Grounds of Faith* (1852); *The Temporal Power of the Pope* (1866); *The True Story of the Vatican* (1877-88); *The Catholic Church and Modern Society* (1880); *The Eternal Priesthood* (1883); and numerous volumes of sermons and letters on ecclesiastical topics. He died Jan. 14, 1892. See *Life of Cardinal Manning*, by Edmund Sheridan Purcell (1896).

MANNING, THOMAS COURTLAND, an American jurist; born in North Carolina in 1831. In 1855 he removed to Louisiana. He sat in the secession convention of that state, and became an officer in a Louisiana regiment. In 1863 he was appointed adjutant-general, with the rank of brigadier-general. For one year he served as associate justice of the supreme court of Louisiana,

and in 1877 became chief justice. This office he held for three years, and in 1880 was appointed United States Senator, but was not admitted by the Senate. From 1882 to 1886 he again sat on the supreme bench of the state of Louisiana, after which he was appointed by President Cleveland as minister to Mexico, which office he filled until his death, in New York City, Oct. 11, 1887.

MANNITE. See FERMENTATION, Vol. IX, p. 97.

MANOA. See EL DORADO, Vol. VII, p. 830.

MANOEL DO NASCIMENTO. See PORTUGAL, Vol. XIX, p. 557.

MAN-OF-WAR BIRD. See FRIGATE-BIRD, Vol. IX, p. 786.

MANSARD OR MANSART, FRANÇOIS, a French architect; born in Paris, Jan. 23, 1598. He originated the peculiar roof known by his name was first architect of the king and designed the royal buildings, built the hotels De Bouillon, Toulouse and Jars, and the gates of the churches of the Feuillants and of Les Filles Ste. Marie. He died in Paris, Sept. 23, 1666.

MANSARD, JULES HARDOUIN, a French architect, nephew of the preceding; born in Paris, April 16, 1646. He was a son of the painter Raphael Hardouin, but took his name from his uncle. He was architect of the king; received the order of St. Michael (1693); was made a noble (1683); and was a member of the Academy of Fine Arts from its commencement. His work was merely representative of the style of his time. His most important works were the chateau of Versailles, and the chateau and pavilions at Marley. He died at Marly, May 11, 1708. See also VERSAILLES, Vol. XXIV, p. 177.

MANSFIELD, a town of Bristol County, southeastern Massachusetts, 25 miles S.W. of Boston, on the New York, New Haven and Hartford railroad. Cutlery, baskets, gold, shell and horn jewelry, straw hats, bonnets, ranges and stoves, taps and dies, are manufactured. The town also contains foundries, spindle-works, and a public library with 2,800 volumes. Population 1890, 3,432; 1895, 3,722.

MANSFIELD, a city of northern central Ohio. It has a large mercantile wholesale trade, averaging about \$3,000,000 annually. It is supplied with electric lights and electric street-railways. Population 1890, 13,473. See MANSFIELD, Vol. XV, p. 498.

MANSFIELD, a borough of Allegheny County, southwestern Pennsylvania, five miles W. of Pittsburgh, on the Pittsburgh, Cincinnati, Chicago and St. Louis and the Pittsburgh, Chartiers and Youghiogheny railroads. It is a mining and manufacturing town, shipping coal, lead, lumber, sheet-iron, glass, locks, etc., and has a supply of natural gas. Its post-office name is Carnegie. Population 1890, 2,352.

MANSFIELD, a post borough of Tioga County, central northern Pennsylvania, 40 miles N. of Williamsport, on the Tioga River, and on the New York, Lake Erie and Western railroad. It is in an agricultural region, and is the seat of a state normal school, school for soldiers' orphans, has

flour, saw and planing mills, cigar, clothes-pin and mattress factories, a bedstead factory and an iron-furnace. Population 1890, 1,762.

MANSFIELD, EDWARD DEERING, an American author; born in New Haven, Connecticut, Aug. 17, 1801. He was a graduate of West Point and the College of New Jersey; in 1825 was admitted to the Connecticut bar, and in 1835 became professor of constitutional law in Cincinnati (Ohio) College. He edited the Cincinnati *Chronicle* from 1836 to 1849, the *Atlas* from 1849 to 1852, and the *Railroad Record* from 1854 to 1872. He wrote many books on law, mathematics, politics and history, among them being *Life of Winfield Scott* (1848) and a *History of the Mexican War* (1848). He died at Morrow, Ohio, Oct. 27, 1880.

MANSFIELD, JARED, an American mathematician; born in New Haven, Connecticut, May 23, 1759; graduated from Yale in 1777; taught in New Haven and Philadelphia till 1802, and then entered the army, as captain of engineers. In 1805 he was made major, and in 1808 lieutenant-colonel. From 1803 to 1812 he was United States surveyor of Ohio and the Northwest Territory, and then till 1828 was professor of experimental and natural philosophy in the United States Military Academy. He wrote *Essays, Mathematical and Physical* (1802). He died Feb. 3, 1830.

MANSFIELD, JOSEPH KING FENNO, an American soldier; born in New Haven, Connecticut, Dec. 27, 1803. He entered the army in 1822, and was assigned to the engineer corps. In 1832 he became first lieutenant, and in 1838 captain. He took part in the Mexican War, and received the brevet of colonel for meritorious conduct. For five years he was a member of the board of engineers for the fortification of the Atlantic and Pacific coasts. In 1853 he was appointed inspector-general of the United States army, and in 1861 was placed in command of the Department of Washington. Later he was assigned to Suffolk, Virginia, where he acted as military governor. At the battle of Antietam he was mortally wounded. He had previously been promoted major-general of volunteers. He died Sept. 18, 1862.

MANSFIELD, RICHARD, an American actor; born on the island of Heligoland, May 24, 1857. His mother was Madame Rudersdorff, a singer. He passed his early life in the United States, while his mother was filling engagements there; went with her to London and attended school studied for the East Indian civil service, but abandoned that idea for business; not succeeding, tried both literature and art, with the same result. His first public appearance was at a musical entertainment at St. George's Hall, London; soon after obtained an engagement



RICHARD MANSFIELD.

with a Gilbert and Sullivan traveling opera company to play small parts. He made a visit to America and appeared as Koko in *The Mikado*, wherein he made a decided success. He appeared in 1878 as Dromez in the comic opera of *Les Manteaux Noirs*, and when *A Parisian Romance* was produced at the Boston Museum in 1883, he showed of what artistic material he was made. His Baron Chevrial was a great creation. In 1886 he appeared as Prince Karl in the play of that name at the Madison Square Theater, New York. In *Dr. Jekyll and Mr. Hyde* he achieved a marked success, and played acceptably in this in London in 1888. His later notable rôles are Rev. Arthur Dimmesdale in Joseph Hatton's dramatization of *The Scarlet Letter*, Beau Brummel and Tittlebat Titmouse in *Ten Thousand a Year*.

MANSFIELD COLLEGE, a theological school, at Oxford, England, established as a training-place for men who intended entering the Nonconformist ministry, but its classes are open to the graduates of any recognized university. It has scholarships in arts and in theology, each of the value of \$300 a year. A settlement in connection with the college is maintained at Canning Town East. The college buildings were opened Oct. 15, 1889.

MANSFIELD MOUNTAIN, a peak on the boundary between Lamoille and Chittenden counties, northwestern Vermont, and the highest peak of the Green Mountains. It is a favorite resort for tourists, on account of its own grandeur and the fine view afforded from its summit. It not only commands a view of the Adirondacks, Lake Champlain, the Green and White Mountains, but in clear weather even of the mountains about Montreal. Altitude, 4,429 feet.

MANSION HOUSE. See LONDON, Vol. XIV. p. 820; and in these Supplements.

MANSLAUGHTER. See MURDER, Vol. XVII, pp. 52, 53.

MANT, RICHARD, an English prelate; born in Southampton, Feb. 12, 1776. He was educated at Oxford, and after holding curacies at Southampton and London, he became successively bishop of Killaloe (1820) and of Down and Connor (1828). He is best known by an *Annotated Bible*, which he prepared in partnership with George D'Oyly (1814), while his most ambitious work is *History of the Church of Ireland from the Reformation to the Revolution* (2 vols., 1840; 2d ed., 1841). His metrical version of the *Book of Psalms* and *Ancient Hymns of the Roman Breviary* (1837) have considerable merit. He died at Ballymony, Ireland, Nov. 2, 1848.

MANTES, the ancient Medienta, a town in the French department of Seine-et-Oise, 30 miles W.N.W. of Paris, on the left bank of the Seine. It has a fine tower (1344) and a Gothic church, a reduced copy of Notre Dame at Paris. Mantes was burned in 1083 by William the Conqueror, who here received the injury that caused his death. Population 1891, 6,900.

MANTEUFFEL, EDWIN HANS KARL, FREIHERR VON, a Prussian general and administrator; born in Magdeburg, Feb. 24, 1809. Entering the

Prussian Guards in 1827, he rose to be colonel by 1854, and three years later was nominated head of the military bureau at Berlin, a post which he held until 1865, when he was appointed military governor of Schleswig. As commander of the Prussian troops in Schleswig, he protested against the summoning of the Holstein estates by marching his men into that duchy. On the outbreak of hostilities Manteuffel commanded a division of the army of the Main, which was destined to act against the South German allies of Austria. He took part in the battle of Langensalza, which brought about the capitulation of the Hanoverian army, and on the 19th of July succeeded Von Falckenstein as commander-in-chief of the Main army, and by winning the battles of Werbach, Taubenbischofsheim, Helmstadt and Rossbrunn, over the Bavarians and others, he brought that part of the campaign to a successful issue. He entered the war of 1870 as commander of the first corps, but was soon promoted to the command of the first army, which fought successfully at Amiens and other places. Transferred in January, 1871, to the command of the army of the south, operating against Bourbaki, Manteuffel assailed the enemy's rear near Belfort, and drove 80,000 men across the frontier into Switzerland. When peace was proclaimed he was placed at the head of the army of occupation in France; was made general field-marshal in 1873; and in 1879 was appointed imperial viceroy of the newly organized province, Alsace-Lorraine. He died at Carlsbad, June 17, 1885.

MANTI, a city and the capital of San Pete County, central Utah, 23 miles S.E. of Nephi, in a beautiful and fertile valley; on the San Pete Valley and Rio Grande Western railroads. It is in an agricultural and sheep-raising region, having an annual product of 100,000 bushels of grain and 500,000 pounds of wool. The city contains several Mormon churches, a Mormon seminary, and a Mormon temple built at a cost of over \$1,500,000. Population 1890, 1,950; 1895, 2,328.

MANTIS-SHRIMP, a small marine crustacean of the genus *Squilla*, and order *Stomatopoda*. These crustaceans somewhat resemble the mantis insect in external appearance.

MANU OR MENU. See SANSKRIT, Vol. XXI, p. 288; and INDIA, Vol. XII, p. 782, note.

*MANUAL TRAINING IN THE PUBLIC SCHOOLS. Manual training conveys to the mind such indefinite and varying meanings, and its advocates are so lacking in precision of statement concerning its purpose, that it is necessary to fix as exactly as possible what the name means to the educational mind. Industrial and manual training are used interchangeably, and manual training is frequently contrasted with the Swedish or "sloyd" system. Industrial or technical, and manual, training, from the point of view of latter-day education, mean entirely different things, suggest radically different methods, and have absolutely different ideals.

There is the greatest diversity in the use of the word *industrial*. It has been applied to reform schools, to trade schools, to charitable institutions

where boys spend half their time at ordinary labor, earning their living or a part of it, and it has been given indiscriminately to manual-training and technical schools. As generally used, industrial training means the education of neglected children, reclaiming them from evil influences and training them to habits of industry. "Industrial schools" are really schools for the reclamation of juvenile vagrants and the neglected children of criminal parents.

In a wider sense, industrial training is used synonymously with *technical* training, which includes instruction in the arts and sciences underlying the practice of trades or professions. This training may be general as well as special instruction, applicable to certain groups of industries; or it may provide special instruction only, with or without practice, in certain handicrafts. But it is now found convenient to restrict the term "technical" to education in that special training which helps qualify a person to engage in some productive industry.

The problems of industrial and technical education, then, are social and utilitarian. But there are purely psychological and educational arguments in favor of *manual training*, which is to be regarded as having that definite social result common to all efforts to develop the higher life of mankind. The system is based, not merely upon the industrial demands of our time, but upon what should constitute an education fitted to prepare a human being for existing social conditions. The name is unfortunate and misleading. A manual-training school is neither a technical nor an industrial school. It is far too elementary to deserve the name "technical," and, on the other hand, it is too wide and free to merit the term "industrial." The object of every feature is education in a broad and high sense.

Manual training is but a single factor in the great educational product of the nineteenth century. It is a logical outcome of the thought which Pestalozzi contributed to the philosophy of teaching, and which, under Froebel, brought forth its best results in kindergarten instruction. Its well-known motto is, "Learning by doing"; not simply learning to execute a particular piece of work, but training all the faculties which come into play in the operation—observation, concentration, precision, construction—leading to mastery and power.

About twenty-five years ago Herbert Spencer declared that new conditions were forcing new methods upon us; that intellectual growth must come through the pursuit of scientific studies rather than the traditional Greek and Latin. But Spencer did not enunciate the new gospel. The departure was inevitable as soon as education became democratic. The universal education could not come through the classics, which of themselves do not appeal to the large mass of the people, being the delight of the philosopher and student, but seldom appeal to the world of action. While classic acquirements continue to attract a limited number, the majority of men will choose to derive their culture from every accident and incident of life and nature.

The methods of manual training known as the Russian and the Swedish are frequently contrasted.

All methods agree in making physical exercise the basis of instruction; also in adopting the inductive method of teaching. The Swedish or "sloyd" system differs from most of them in using wood as the only material for construction, and in the form of the models. It is less technical than the systems of France and Denmark, and less theoretical than that of Germany, laying greater stress on the utility of the articles and upon introducing curved lines at an earlier stage. This system (*slöjd*) came originally from Finland, but was adopted some twenty years ago in Sweden, and there perfected in its methods. Its aim is not to teach the pupil a trade, but to educate him. Its primary object is to insure a healthy physical and mental development, while its secondary object is to secure a general dexterity useful in every vocation. The method is based upon the principle that a harmonious mental development is best secured through a harmonious physical development promoted by exercise. It proceeds first to call the physical activities into play, and by stimulating, strengthening and training these, it seeks to awaken, develop and cultivate the powers of the mind. Taking advantage of the pupil's activity, it permits him to engage in work so arranged as that he is led to discover the principle to be taught, and thus apply his knowledge in obtaining a useful training.

The method in general use in the secondary schools is known as the Russian method, because of its introduction into this country through the influences of the Russian exhibit at the Exposition of 1876. As stated by one of the leading authorities on the subject, this system of manual training is limited to teaching and learning the use of tools, the method of working materials, and the construction and use of shop-drawings—mechanical designs—where the mastery of tools, materials and methods is the immediate end in view. The instruction and practice deals with general principles, and the forms used in exercises are as typical as possible. "While in hand they are particular, definite and precise, because every concrete exercise must be particular, however general may be the application of the ideas involved" (Woodward). The same authority declares that "in any fundamental process . . . the judicious teacher places great emphasis upon this mastery of tools."

The whole manual-training movement is now in its formative period, and the time is a critical one. There will, very naturally, flow from the different methods in use a distinctive system embracing the best features of all. There is nothing at bottom antagonistic in the Russian and Swedish methods, the principles and aims of both being really the same. Whatever differences there may be in methods arise more from historical accidents than from pedagogical principles. At present the Swedish system is found to be more practicable in elementary schools and with the younger children, while the Russian system in high-schools gives opportunity for that more vigorous exercise which older boys naturally crave. Where the question arises of providing this training for girls in high-schools, the Swedish comes nearer the ideal than the Russian

system. It is to be regretted that manual training for girls has yet to receive important consideration.

But aside from the method of manual training, the spirit of that training is of paramount moment to the educator. Two rival theories contend for the mastery of its future. The one regards manual training as an end in itself, and subordinates education to technical skill. The school is heralded as the legitimate successor of the apprentice system, and it is an institution whose highest end is to restore the advantages lost in the abolition of that system. According to this theory, the ability to *do* becomes the standard of success for the school, and the chief object of its ambition the production of well-executed handiwork.

The other theory also sees in the school an establishment for the manufacture of a definite product; but it is a product too subtle to find its expression in wood or iron or clay. In this view the school is a purely educational institution, and is industrial only in making use of the tools of industry to accomplish its chosen purpose. The manual work, like the work in science and literature, is simply a means of development.

The antagonism of these two theories is apparent, and in nearly all manual-training schools the two may be found in conflict. In one way this is an advantage, for the methods act as a check upon each other. The practical side is kept from becoming sordid, the spiritual side from being visionary. But the balance of power between the two is of the utmost importance, for it determines the character of the school.

The history of manual training in the public schools of the United States is by no means extensive. The St. Louis school was organized under the charter of Washington University, in the year 1879. As established, this school was the outcome of efforts to supply the polytechnic students of the university with the necessary preliminary training. Its development into a high-school system for general purposes was the result of the experience obtained in that preparatory work, and a new type of school was originated, examples of which now exist in a score or more cities. The Chicago school resembles the St. Louis school in most particulars, but not being related as a preparatory school to a higher institution, it has embodied more distinctly the idea of the high-school principle. This school is supported by private endowment, and is attended by boys who have successfully passed through the ordinary grammar-school course. The Toledo and Cleveland (1885) manual-training schools differ from the foregoing. In these cities the manual-training schools are not complete and independent schools, but are annexed to public high-schools, and are supported by private endowments. The Toledo school is open to girls as well as boys, and sewing, cooking and dress-making, with drawing, wood-carving and light joinery, together with the ordinary shop-work, are included in the course of study. Baltimore (1884) and Philadelphia (1885) each organized complete and independent schools under the direct control of their respective boards of education. These schools were the first manual-

training schools established in the United States as part of a municipal system of education, and the requirements for admission render them true high-schools in their relations with other parts of the public-school system. With this departure a new stage in the growth of the system was attained. The establishment of the Mechanic Arts High School in Boston assures permanency of this new educational element in the public secondary schools. The development of these schools was illustrated at the Columbian Exhibition, Chicago, 1893.

At present, in the greater number of cities the manual-training schools are attended by the pupils of the higher grades of the grammar-schools. In Toledo, boys and girls attend from the senior classes; in Baltimore, boys from the two upper grades are admitted, although in general the work is not yet organized so thoroughly as in Philadelphia and Boston. Experience has shown that city-bred boys under the age of 14 seldom undertake the regular shop-instruction with satisfactory results. If such boys are admitted, lighter kinds of work must be provided for them. This means that sloyd in the elementary schools offers the opportunity for attaining the results aimed at in the secondary schools. Although the efforts are isolated, there has been an unquestioned advance in this direction. One of the most interesting steps taken was the establishment in Philadelphia of the James Forten Elementary Manual Training School. The principle of the work of the kindergarten continues through the "primary" grades, and it is hoped to develop an elementary school which will be completely organized on the modern plan. This school, above mentioned, is in the least prosperous portion of the city, and has grown from an attendance of fifty to one of over four hundred. The majority of the pupils are of Russian parentage, and many upon entering have no knowledge of the English language. At the outset a visitor had to be employed to secure the attendance of the children, but to-day the interest is so great that the regular visitation has practically ceased.

It is too early to speak with any degree of certainty as to the educational results of manual training in the public schools. A system barely ten years in use, at first bitterly opposed by nearly all professional educators, and now only grudgingly admitted to the traditional curriculum, can hardly do more to justify the hopes of its advocates. In Philadelphia nearly seven hundred boys attend two schools, and the time is not far distant when a third will be organized. Not only have the opportunities for higher education been multiplied, but the youths attracted to the manual-training schools are retained there. It has been observed that during the first or freshman year of an ordinary high-school the percentage of loss is very great. The latest report of the Central High School of Philadelphia shows 491 students in the lowest class as against 210 in the next higher class; while a recent report of the high-school of Cincinnati says the greatest drop in numbers occurs in the lowest class. This seems to be true of the Boston high-school. The latest report shows this record:

	FIRST YEAR.	SECOND YEAR.
English high-school-----	381	169
Girls' high-school-----	371	193
Roxbury high-school-----	243	123

When comparison is made of graduating classes with the number entering from grammar-schools, the contrast is still more significant. The figures for Philadelphia show that but 18 per cent of those entering the Central High School graduate.

Boston's high-schools graduate from 15 to 20 per cent, Brooklyn about 15 per cent, and Cincinnati 10 per cent. As to the influence of manual training upon this tendency to drop by the way, one hesitates to speak too decisively. But Superintendent Seaver, in a report made in 1890, says of the boys of the Toledo school that "the tendency to drop out has been decidedly checked." The records of the Philadelphia schools give instructive results. The Central Manual Training School every year admits classes of from 130 to 150 boys. Of these, there graduated 68 in 1891, 70 in 1893, 76 in 1894, 76 in 1895.

The class of '95 numbered 150; of these, 90 remained the three years of the course, 82 graduated and 32 entered the University of Pennsylvania. The history of the North East School tells a similar story; and wherever introduced into elementary school-work, we are impressed with the fact that the tendency to leave has been checked. What further effect manual training may have remains to be seen. But the theory that a great falling-off in attendance upon school is due to economic causes receives little support from the returns of Chicago's compulsory-education authorities, who report in 1890 that of 7,664 children out of school, 1,540 were at work, while 3,528 were absent from indifference.

Another noteworthy fact is the large number of graduates of manual-training schools who enter colleges and universities. The stimulus to professional, scientific and technical work which these schools have given is an important step in the closer relations of secondary with higher education. The reorganization of our elementary curricula upon a basis recognizing the value of the principle in the different methods of manual training, will in time result in a system of general education from which our social organization will profit. The road from the kindergarten to the university will then be clear and definite.

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MANUEL, JUAN. See SPAIN, Vol. XXII, p. 354.
MANUSCRIPTS. See PALÆOGRAPHY, Vol. XVIII, pp. 144-166.

MANX LANGUAGE. See MAN, ISLE OF, Vol. XV, p. 453.

MANZANILLO, a harbor town of Cuba, on the east shore of the Golfo de Guacanayabo, 85 miles W. by N. of Santiago de Cuba, in lat. 20° 20' N., long. 77° 8' W. It has a very good harbor and a large export trade in sugar, tobacco, fruit and timber. Population 1887, 34,220.

MANZANILLO, a port of Mexico. See COLIMA, Vol. VI, p. 141.

MAORIS. See NEW ZEALAND, Vol. XVII, p. 471.

MAPLESON, JAMES HENRY, an English operatic manager; born in London, in 1832. He studied at the Royal Academy of Music; spent some years in voice-culture, when an operation for an affection of the throat made impossible his intended career as a vocalist; in 1856 became business agent and manager of traveling companies; was assistant of E. T. Smith, and in 1861 his successor, in managing Italian opera. He opened at the Lyceum in 1861, and afterward became lessee of Her Majesty's Theatre, London. In 1861 Adelina Patti appeared under his management. He afforded the public first productions of many great operas, and had under his management many of the greatest operatic artists of his time. His company traveled in the United States in the intervals of the London season after 1878. He published *Mapleson Memoirs* (1888).

MAPLESON, MARIE-ROZE PONSIN, a French singer; born in Paris, March 2, 1846. She studied at the Conservatoire, and made her *début* as Marie, in the opera of the same name, in 1865; sang in various operas in Paris until the outbreak of the Franco-Prussian War, when she joined the ambulance department. From 1872 to 1877 she sang successfully in England; visited the United States in 1877, returning to England the next year. She was married, first to Julius Perkins, and, after his death in 1875, to James Henry Mapleson. Her best parts include Marguerite in *Faust*; Berengario in *Il Talismano*; Leonora, Mignon and Carmen.

MAPLE-SUGAR, a sugar made from the sap of the sugar-maple (*Acer saccharinum*, also known as *A. barbatum*). The sap is nearly pure sugar and water, with a slight admixture of organic compounds, malic acid, etc., which give it the peculiar flavor so much prized. It is worth more than double the price of cane-sugar, and never is refined. The proportion of sucrose in the sap varies from 1.95 to 5 per cent, the average being about 3 per cent. The average amount of sap required for a pound of sugar is about 16 quarts. Vermont produces not only the largest quantity but the best quality of maple-sugar. In 1889 the total product was 32,952,927 pounds, a decrease of 3,623,134 pounds from the report of 1879. In 1849 the total amount produced was 40,120,209 pounds. Of the amount produced in 1889, Vermont made 42.86 per cent; New York, 31.82 per cent; New Hampshire, Pennsylvania, Michigan and Ohio together, 21.22 per cent. Eighteen other states reporting to the Census Bureau produced together but 4.1 per cent of the total. Vermont was the only state that showed an increased production during the decade ending in 1889. See SUGAR, Vol. XXII, p. 628.

MAQUET, AUGUSTE, a French novelist and playwright; born in Paris, Sept. 13, 1813. He was educated at the Collège Charlemagne, and in 1831 became a teacher there. He collaborated with the elder Dumas in the writing and dramatization of some of his most-famous novels, e.g., *The Three Musketeers* and *Count of Monte Christo*, etc. He afterward wrote and dramatized, under his own name, a number of novels. Among them were *La Belle Gabrielle* (1853); *La Maison du Baigneur*

(1856); and *La Rose Blanche* (1859). He died at Saint-Méen, Jan. 8, 1888.

MAQUOKETA, a city and the capital of Jackson County, central eastern Iowa, 30 miles S. of Dubuque, on Maquoketa River, and on the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads. It is in a grain and live-stock region, with abundant timber, and has manufactories of machinery, woolen goods, flour and cigars, and has the Boardman Library Institute. Population 1890, 3,077; 1895, 3,448.

MARABOU STORK. See **JABIRU**, Vol. XIII, p. 529.

MARACAYBO OR **MARACAIBO**, **GULF OF**, a wide inlet of the Caribbean Sea, extending southward into the coast of western Venezuela, between the peninsulas of Paragana and Guajira, to the strait by which it is connected with Maracaybo Lake. The gulf and lake were discovered in 1499 by Rodrigo de Bastidas and Juan de la Casa, who found here houses built on piles, and called the district Venezuela ("Little Venice"), which afterward was extended to the entire country.—**MARACAYBO LAKE** is a large body of water extending southward from the gulf, and occupying a large basin formed by the Sierra de Perija and the Cordillera des Merida, 102 miles long and 59 miles wide, except at the southern extremity, where it is 75 miles. It is connected with the gulf by a neck 34 miles long and 9 wide. Ships of over 10 feet draft, however, cannot enter the lake, on account of shifting sand-bars. The water is fresh and the tide has very little effect on it. Fish are abundant. It has several lines of steamers. The banks of the lake are low, and in the southern part very unhealthy. Area, 8,392 square miles; depth, 500 feet.

MARAJÓ, an island of Brazil, situated between the estuaries of the Amazon and the Para, with an area of nearly 18,000 square miles. It is for the most part low and covered with grass and bush, but in the east and south with dense forest. The soil is fertile, and large herds of cattle are reared in the northeast.

MARANHAO, a state of northern Brazil, and its capital. See **MARANHAO**, Vol. XV, p. 526; and **BRAZIL**, Vol. IV, pp. 235, 237, et seq.

MARAÑÓN. See **AMAZON**, Vol. I, p. 654.

MARASCHINO. See **CHERRY**, Vol. V, p. 586.

MARASMUS (decay, wasting away), a synonym for the general wasting of the body. The symptoms are loss of flesh and fat, loss of color, loss of strength, and sometimes degeneration of tissues. There is often a deficiency of blood, in quantity, or of its constituents. The causes are unsuitable or insufficient food; derangements of the digestive organs and lymphatic glands, want of light, air and exercise; the presence in the body of morbid agents, as malaria, tubercles, cancer, syphilitic poison, etc.; loss of blood from chronic suppuration, repeated hemorrhages and other causes. Marasmus is common at all periods of life. In infants it is due chiefly to bad feeding, and catarrhal affections of the digestive organs. After the age of three years tubercular enlargement of the mesenteric

glands are not infrequent, interfering with the passage of elaborated food to the blood. After the sixth year there may be tuberculosis of the lungs, disease of the kidneys, etc. In the adult the cause is almost always some organic disease, which deranges nutrition or the elimination of waste products from the body. As marasmus is not a specific disease, but a condition due to diseases often obscure, its treatment should in every case be prescribed by a physician.

MARATHON, a post village of Cortland County, south central New York, 50 miles S. of Syracuse, on the Tioughnioga River, and on the Delaware, Lackawanna and Western railroad. It is a shipping-point for butter, cheese and live-stock. Carriages and cheese-boxes are manufactured and hidestanned. Population 1890, 1,198.

MARATTA, **CARLO**, an Italian painter; born at Camerino, Italy, in May, 1625. He was a pupil of Andrea Sacchi, a student and follower of Raphael, and a painter whose work was much admired in his day. He first attracted attention by a *Nativity* (1650). He was in the employ of several popes, from Alexander VII to Clement XI, who made him a knight of the Order of Christ; and he was painter-ordinary to Louis XIV. He restored the Raphael frescoes in the Vatican and in the Farnesina; did some fresco work of his own; and painted many Madonnas. His best works are *St. Carlo*, in the church of that name in Rome, and the *Baptism of Jesus Christ*, at the Certosa. He was the last of the Roman school, and died in 1713.

MARBLEHEAD, a town in Massachusetts. Abbott Hall, founded here in 1877; has public library and an art gallery containing several notable paintings, including Willard's *Yankee Doodle*. The town has also a public library with 12,500 volumes, and has electric lights and street-railway. It is noted as the yachting-center of New England. Population 1890, 8,202; 1895, 7,671. See **MARBLEHEAD**, Vol. XV, p. 530.

MARBURG, **CONFERENCE OF**. See **LUTHER**, Vol. XV, p. 82.

MARCEAU, **FRANÇOIS SEVERIN DESGRAVIERS**, a French general; born in Chartres, March 1, 1769. On the outbreak of the revolution he was appointed inspector of the National Guard in his native town, and in 1792 helped to defend Verdun with a body of volunteers till its surrender. Sent to join the Republican army in La Vendée, he was promoted to the rank of general of division. He commanded the right wing at Fleurus, and after the allies retreated, occupied Coblenz. During the campaign of 1796 he was given command of the first division of Jourdan's army, and sat down to invest Mainz, Mannheim and Coblenz. But whilst covering the retreat of the French at Altenkirchen he was shot, on the 19th of September, and died four days later. His body was buried in the intrenched camp at Coblenz, but was transferred to the Panthéon in Paris in 1889.

MARCELINE, a town of Linn County, northern central Missouri, 33 miles E. of Chillicothe, on the Atchison, Topeka and Santa Fé railroad. Coal, limestone, granite, fire-clay and brick-clay are found

in the vicinity in large quantities. Population 1890, 1,977.

MARCH, river. See MORAVIA, Vol. XVI, p. 810.

MARCH, AUZIAS. See SPAIN, Vol. XXII, p. 363.

MARCH, FRANCIS ANDREW, an American philologist; born in Millbury, Massachusetts, Oct. 25, 1825;



PROF. F. A. MARCH.

graduated at Amherst College in 1845; was tutor there for two years; was admitted to the New York bar in 1850, retiring two years later on account of ill-health. In 1858 he was chosen professor of the English language and comparative philology in Lafayette College, Easton, Pennsylvania. He devoted himself specially to the Anglo-Saxon language, ranking among the foremost scholars in that depart-

ment, and in 1873 was chosen president of the American Philological Association. He was chairman of the committee of that association, appointed in 1874, which is working with a committee of the Philological Society of England for a scholarly and authoritative revision of English spelling. He directed from 1879 the work in America for the *Historical Dictionary of the English Language* of the Philological Society of England, published by the University of Oxford, and had charge of the philological department of the *Standard Dictionary* (1895). He was president of the Spelling Reform Association, councilor of the American Educational Association, vice-president of the New Shakespeare Society and honorary member of the Philological Society of London; and published *A Method of Philological Study of the English Language* (1865); *An Introduction to Anglo-Saxon* (1871); a series of *Greek and Latin Writers* (1874-77); and *The Relation of the Study of Jurisprudence to the Origin and Progress of the Baconian Philosophy* (1848).

MARCHANT, EDWARD DALTON, an American portrait-painter; born in Martha's Vineyard, Massachusetts, Dec. 16, 1806. He studied in New York; afterward went South and West, finally locating in Philadelphia. He did little besides portrait-painting, and for a few years was almost blind, but his sight was restored, and he did some of his best work in his eighty-first year. Among his portraits are those of Lincoln, Henry Clay, John Quincy Adams, Andrew Jackson, Hannibal Hamlin, Schuyler Colfax and John C. Frémont. He died at Asbury Park, New Jersey, Aug. 15, 1887.

MARCHES, the border districts that run contiguous on each side of the boundary-line between England and Scotland, and between England and Wales. The lords of the marches were the nobles to whom estates on the borders were given on condition that they defended the country against the aggressions of the people on the other side. Under the Norman and Plantagenet kings of England there was almost chronic war between the English lords of the marches and the Welsh. The corre-

sponding German word *mark* was in like manner applied to the border countries or districts of the German Empire conquered from neighboring nations, as the marks of Austria, of Brandenburg, Altmark, Steiermark, etc. Likewise in Italy the marches are the ancient frontiers or borderlands of the various states. The prefect of the marches, in low Latin *Marchensis*, was the military officer whose duty it was to defend the marches. Hence was derived the title of marquis, still in use in the British Empire, Germany, France and Italy.

MARCHETTI FILIPPO, an Italian opera composer; born in Balagnola, Italy, Feb. 26, 1831. He was educated at the conservatory in Naples; and, after composing two operas which were received favorably, removed to Rome, where he taught singing. From 1881 to 1886 he was head of the Academy of Sainte-Cecile, in Rome, and afterward director of the Conservatory of Music there. He is best known as composer of *Gentile da Varano* (1856); *La Demente* (1857); *Roméo et Juliette* (1865); *Ruy Blas* (1869); and *L'Amore alla Prova* (1875).

MARCHING. See WAR, Vol. XXIV, pp. 362, 363.

MARCOMANNI. See GERMANY, Vol. X, pp. 474, 475, 477, 478.

MARCO POLO. See POLO, Vol. XIX, pp. 404-409.

MARCOU, JULES, a French geologist; born in Salins, France, April 20, 1824. In 1846 he was appointed assistant in the mineralogical department of the Sorbonne, and a year later became traveling geologist for the *Jardin des Plantes*. He visited the United States, gathering much important information and making valuable collections of minerals. In 1853 he entered the United States service, and did good work until his health compelled him to return to France. From 1855 to 1859 he was professor of geology in the Polytechnic School at Zürich, but in 1861 returned to the United States and was associated with Louis Agassiz in the foundation of the Museum of Comparative Zoölogy, having charge of the palæontological department till 1864. In 1875 he again entered the United States service. His works include a *Geological Map of the United States* (1853); *Geology of North America* (1858); *Résumé Explicatif d'une Carte Géologique des États-Unis et des Provinces Anglaises de l'Amérique du Nord* (1855); *Drias et Trias* (1859); *Derniers Travaux sur le Drias et le Trias en Russie* (1870); and *Mapotica Geologica Americana* (1884).

MARCUS AURELIUS ANTONIUS. See AURELIUS, Vol. III, pp. 86-89.

MARCY, MOUNT. See *Mountains*, under NEW YORK, Vol. XVII, p. 450.

MARCY, HENRY ORLANDO, an American surgeon; born in Otis, Massachusetts, June 23, 1837; was educated at Amherst and at the Harvard Medical School, where he graduated in 1863; immediately joined the Union army as assistant surgeon; became medical director, and at the close of the war went to Europe for study. Returned in 1880 and practiced medicine in Boston; was president of the American Academy of Medicine in 1882 and of the American Medical Association in 1892. He wrote

numerous medical treatises, and published *The Anatomy and Surgical Treatment of Hernia* (1892).

MARCY, RANDOLPH BARNES, an American soldier; born in Greenwich, Massachusetts, April 9, 1812. He entered the army in 1832, and served in the Black Hawk expedition, on the frontier, in the Mexican War and in the hostilities against the Seminole Indians. In 1861 he was made brigadier-general, and was assigned to inspection duties in the Department of the Northwest, Missouri, Arkansas, Mississippi and the Gulf, until 1865, when he was made inspector-general of the division of the Missouri. From 1869 to 1881 he was inspector-general of the United States army. He wrote *Exploration of the Red River in 1852* (1853); *The Prairie Traveler* (1859); and *Border Reminiscences* (1871). He died at Orange, New Jersey, Nov. 22, 1887.—His brother, ERASTUS EDGERTON MARCY, born in Greenwich, Massachusetts, Dec. 9, 1815, became one of the leading homœopathic physicians in America. He was educated at Amherst and at Jefferson Medical colleges, and practiced in Hartford, Connecticut, and in New York. In 1852 he founded and edited the *North American Journal of Homœopathy*. He published *Theory and Practice of Medicine* (1850); *Theory and Practice of Homœopathy* (2 vols., 1858); etc.

MARCY, WILLIAM LEARNED, an American statesman; born in Sturbridge, Massachusetts, Dec. 12, 1786. He graduated at Brown University in 1808. He soon became a leading Democratic politician in New York, and one of the "Albany regency," which was said to control the action of the party in that state. He became a judge of the state supreme court in 1829, and was United States Senator in 1831–32, during his term incidentally making use of the phrase so frequently afterward heard, "To the victors belong the spoils." He resigned to become governor of New York (1833–39). He was Secretary of War under Polk (1845–49), and Secretary of State under Pierce (1853–57). As Secretary of State he conducted with success the Kosztza case in 1854, involving a collision with Austria on the subject of the right of expatriation. All his political leanings were to that branch of the Democratic party in New York which made the strength of the new Republican party in 1856, and he would have been its natural leader if he had followed his own convictions on the Kansas-Nebraska Bill. He hesitated, and other men took his place. He died at Ballston Spa, New York, July 4, 1857.

MARDI GRAS, a form of carnival. See NEW ORLEANS, Vol. XVII, pp. 404, 405.

MARDONIUS. See PERSIA, Vol. XVIII, p. 571.

MARE ISLAND, an island in the eastern extremity of San Pablo Bay, California, in Solano County. It has a United States navy-yard, sectional floating dock and the United States naval arsenal of the Pacific coast.

MAREMMA, LA, a marshy region of central Italy along the south of Tuscany from Piombino south-east for more than sixty miles to Orbetello, and fifteen to twenty miles inland, mainly within the province of Grosseto and partly in that of Pisa. The principal marsh is that of Castiglione della Pescaja, along the

banks of the Bruna, formerly about ten thousand acres in extent, but being gradually converted by suitable drainage-works into fertile fields. The whole region was once the seat of flourishing Etruscan cities, but now for the most part is deserted, on account of the pestilential vapors that emanate from the stagnant pools. See also BORAX, Vol. IV, p. 50.

MARENGO, a manufacturing city of McHenry County, Illinois, 55 miles W.N.W. of Chicago, on the Chicago and Northwestern railroad. It is the trade-center of a rich agricultural district, devoted almost exclusively to dairying and fruit-raising. It has a steam-foundry, stove-works and a canning factory, and has electric lights and water-works. Population 1890, 1,327.

MARENGO, a manufacturing city and the capital of Iowa County, southeastern Iowa, 27 miles S.W. of Cedar Rapids, on the Chicago, Rock Island and Pacific railroad. It is well situated in the midst of an excellent farming and grazing region. Population 1890, 1,710.

MARENGO, BATTLE OF. See NAPOLEON, Vol. XVII, p. 204.

MARENHOLZ-BÜLOW. See FROEBEL, Vol. IX, p. 795.

MAREOTIS LAKE. See EGYPT, Vol. VII, p. 709.

MARET, HUGUES BERNARD, Duke of Bassano, a French diplomatist; born in Dijon, May 1, 1763. He was an editor at the outbreak of the Revolution, and entered the diplomatic service. In 1792 he was Minister of Foreign Affairs; held various commissions and was Secretary of State under Napoleon (1804); was made Duke of Bassano (1811); was banished by the Bourbons, but recalled to his peerage by the Orleanists (1831); and in 1834 was president of the Cabinet. He died in Paris, May 13, 1839. See FRANCE, Vol. IX, p. 613.

MAREY, ETIENNE JULES, a French physiologist; born in Beaune, Côte-d'Or, in 1830. He studied medicine in Paris, obtaining his degree in 1859. In 1867 he was made professor of natural history in the Collège de France. Dr. Marey invented several instruments for recording the movements of the heart, lungs, arteries, muscles and other parts of the human body, and made many experiments with them. He became an officer of the Legion of Honor in 1882. He published *Physiologie Médicale de la Circulation du Sang; Du Mouvement dans les Fonctions de la Vie; La Machine Animale*, of which an English translation appeared in New York in 1874, under the title *Animal Mechanism; Physiologie Expérimentale* (1875); *La Méthode Graphique dans les Sciences Expérimentales* (1878); and *Le Vol des Oiseaux* (1890).

MARGARET OF DENMARK. See DENMARK, Vol. VII, p. 85.

MARGARET SIDNEY, pseudonym of LOTHROP, HARRIET MULFORD, q.v., in these Supplements.

MARGARIC ACID, a mixture of stearic and palmitic acids, formerly supposed to be distinct chemical individuals, obtained by treating fats with dilute acids. MARGARIN was the compound of the supposed acid, and was the constituent of the fat which yielded the acid by the above treatment.

It is a mixture of tristearate and tripalmitate of glycerin.

MARGARITONE. See **SCHOOLS OF PAINTING**, Vol. XXI, p. 442, note.

MARHEINEKE, PHILIPP CONRAD, a German Protestant theologian; born at Hildesheim, May 1, 1780. He began to teach at Göttingen in 1804; was appointed a theological professor and university preacher at Erlangen in 1805; and subsequently held theological chairs in Heidelberg and Berlin. After Hegel's death Marheineke was the chief figure of the right wing of that philosopher's disciples. His only noteworthy work is *Geschichte der Deutschen Reformation* (1816-34). He died May 31, 1846.

MARIA CHRISTINA, Queen of Spain; born at Naples in 1806; the second daughter of King Francis I of Naples. She died at Ste. Adresse, near Havre, in 1878. See **SPAIN**, Vol. XXII, p. 345.

MARIA CHRISTINA II, Regent of Spain; born July 21, 1858; the daughter of Archduke Charles of Austria. She married Alfonso XII, King of Spain, Nov. 29, 1879, being his second wife. At his death in 1885 she was appointed Regent. The King, her son, was born May 17, 1886.

MARIANNA, a village and the capital of Lee County, northeastern Arkansas, 45 miles W. of Memphis, Tennessee, on the St. Louis, Iron Mountain and Southern railroad. It is in a cotton and corn growing region, is an important trade and shipping-center, and has several gins. Population 1890, 1,126.

MARIANNE ISLANDS, same as **LADRONES**, Vol. XIV, p. 199.

MARICOPA INDIANS, a branch of the Yuman stock. They formerly were distributed over southwestern Arizona and southeastern California, and for mutual protection were united with the Piman Indians, often intermarrying with them but preserving their own language and customs. They are an agricultural tribe, raising principally wheat on irrigated lands, and number between 300 and 400. They live on a reservation along the Gila and Salado rivers in Arizona.

MARIE DE MEDICI. See **FRANCE**, Vol. IX, p. 566.

MARIE GALANTE, an island. See **GUADELOUPE**, Vol. XI, p. 229.

MARIE LOUISE, a French empress. See **NAPOLEON**, Vol. XVII, pp. 215, 222.

MARIENWERDER, a town of West Prussia, picturesquely situated three miles E. of the Vistula and 55 miles by rail S. of Dantsic. It was founded in 1233 by the Teutonic knights, and has an old castle and a cathedral. Population 8,600.

MARIÉTON, PAUL, a French poet; born in Lyons, France, Oct. 14, 1862. He was educated in the classics at his native place, and after early youth engaged in literature. He was a friend of Mistral, and a writer of the new Provençal school. He was chancellor of the Society of *Félibrige*, and was in 1891 major of the society,

for Province proper. Among his works are *Viole d'Amour*, *Hellas*, and *Souvenance*—all poetry; also *Bonaparte Wyse* (1882); *Auguste Fourès* (1883); *Un Félibre Limousin* (1883); *Joséphine Souлары et la Pléiade Lyonnaise* (1884); and *La Terre Provençale* (1890).

MARIETTA, a prosperous manufacturing city and the capital of Cobb County, northwestern Georgia, 17 miles N.W. of Atlanta; on the Marietta and North Georgia and the Western and Atlantic railroads. It is the seat of several educational institutions, and has marble-mills, paper-mills, chair factories and iron-foundries. Kennesaw Mountain is about two miles distant. Population 1890, 3,384.

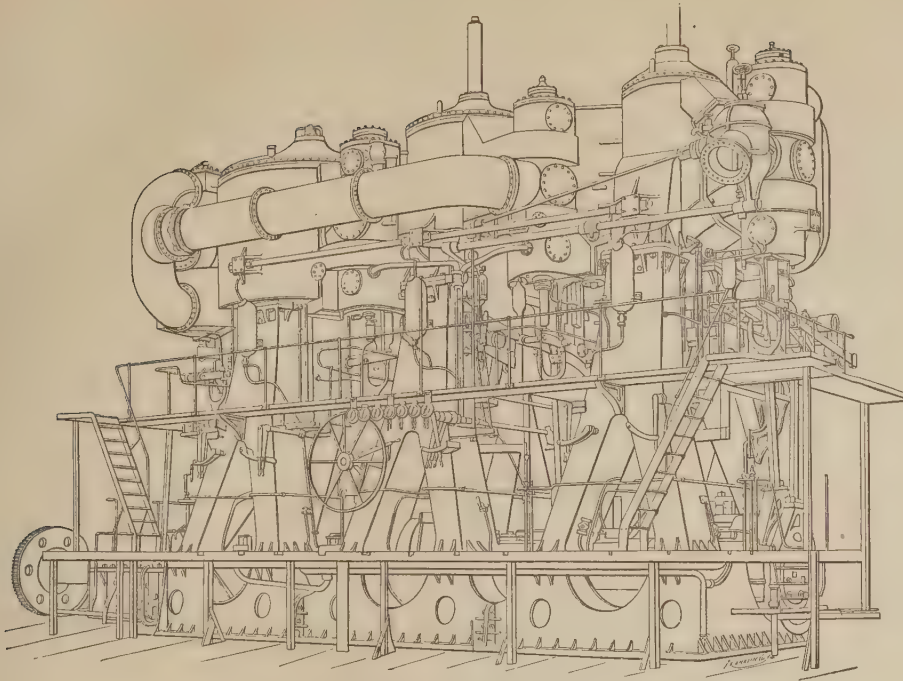
MARIETTA, a city of southeastern Ohio. Marietta is noted for the excellence of its public schools. Marietta College, situated here, had, in 1896, 25 instructors, 297 students, and a library of 52,000 volumes. Population 1890, including the village of Harmar, annexed in that year, 8,273. See **MARIETTA**, Vol. XV, p. 542.

MARIETTA, a post borough of Lancaster County, southeastern Pennsylvania, on the Susquehanna River, and on the Columbia branch of the Pennsylvania railroad, 25 miles S.E. of Harrisburg. It has rolling-mills, furnaces, large hollow-ware and enameling works and lumber mills. It is a market for lumber, quantities of which are floated down the Susquehanna to this point. Population 1890, 2,402.

MARINE CITY, a city of St. Clair County, easternmost Michigan, seven miles below St. Clair, on St. Clair River. Salt is found here, and ship-building, lumbering and the manufacture of wooden articles are important industries of the town. Population 1890, 3,268; 1895, 3,485.

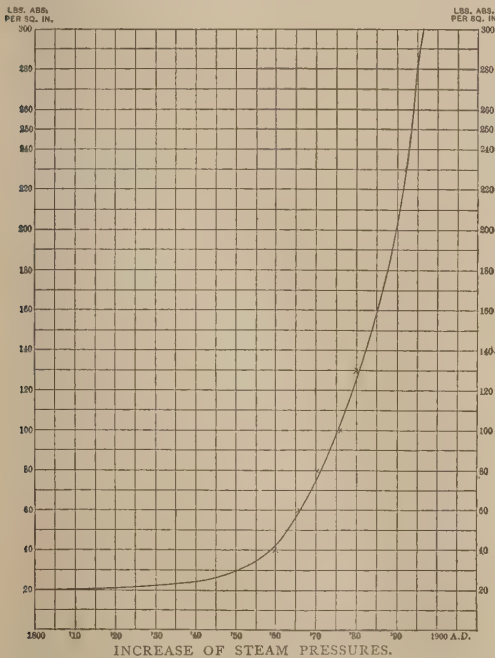
MARINE ENGINES. The marine engine of the multiple-cylinder, surface-condensing, high-pressure type, has now become standard, and is employed almost universally for sea and river vessels, in which the screw is the propelling instrument, and often, also, in the case of paddle-steamers, as, for example, on Long Island Sound. The higher types of multiple-expansion and multiple-cylinder engines, the triple-expansion and the quadruple-expansion, are recognized everywhere now as illustrating good practice. The former is employed very extensively at sea, and especially for long voyages, and the latter is considered, for exceptionally long cruises at steady speed, desirable, whenever fuel, as is usual in such cases as the latter, is particularly costly, either in price or in transportation. Pressures have continually risen since the introduction, about 1860, of surface-condensation at sea, and as rapidly as builders and users could accommodate themselves to the change and insure safety and certainty in operation of the newer types of engine and their boilers. The accompanying diagram shows the rate in the past and the promise of further increase in the immediate future.* The indications are, that early in the twentieth century, steam can safely be handled at from 300 to 400 pounds per

* *Manual of the Steam Engine*; Thurston; Vol. I, p. 354.



TRIPLE EXPANSION MARINE ENGINE.

square inch, and a generation later we may probably see in common use the pressures experimentally attained by Perkins in 1824-36, who succeed-



ed in controlling 500, then 1,000 and finally 1,500 and 2,000 pounds per square inch. The sharp bend in the curve, at 1850-60, indicates the period of transition alluded to above.

The triple-expansion engine usually consists, as a whole, of three similar simple engines side by side, so arranged as to size of cylinder and disposition of pipes and valves that they work as a series.

There are, however, a number of successful arrangements of three and of four cylinder engines driving but two cranks in which the "tandem" disposition of cylinders is adopted with good results.

The engraving represents one set of the triple-expansion engines of the twin-screw sister-ships the *Paris* and the *New York*. Each set drives one screw. The magnitude of these great engines is indicated by the altitude of the working-platforms and the reversing-wheel. This may be taken to represent a standard and very satisfactory disposition of parts and general proportion of engines.

The proportions of these engines are as follow:*

Steam-cylinders, diameter, inches	45, 71, 113
Stroke of pistons, feet	5
Ratios of volumes	1, 2.489; 6.304 or 0.402; 1; 2.53
Steam-pressure, per gauge, lbs	148
Revolutions per minute	87
Vacuum, inches	26
Mean pressures, lbs	64, 32, 14
Indicated power, H. P.	10,175
Temperature feed-water, F.	119°
Temperature sea-water	54°
Area H. S., square feet	50,250
Area G. S., square feet	1,294
Area condensing surface	33,000
I. H. P. per square foot G. S.	14.8
I. H. P. per square foot H. S.	$\frac{1}{8} \frac{1}{16} = 0.38$

*Manual of the Steam Engine; Thurston; Vol. I, p. 221.

I. H. P. per square foot condensing surface--- $\frac{1}{4} \frac{1}{2}$	0.58
Ratio H. S. to G. S. -----	38.8
Ratio H. S. to C. S. -----	1.52

These figures for power are given by the engineer officers of the ship for passage across the Atlantic made in 5 days, 19 hours, 34 minutes.

General experience, in brief, indicates the marine compound engine, as customarily employed, to exhibit an increase in economy over the simple engine which it displaced of about 30 per cent, and a superiority of the triple-expansion engine, with steam at 140 to 160 pounds, over the compound at 90 to 100, of 20 or 25 per cent, while the latter has not been found to show much advantage with increasing pressures. Similarly, the quadruple-expansion engine exhibits superiority, though in less degree, at 200 to 225 pounds over the triple-expansion.

The three-crank engine also is found to possess advantages over the two-crank in efficiency of mechanism and smoothness of operation, and to demand often even less repair. With similar size of low-pressure cylinder this form of triple-expansion engine may give considerably greater power than the compound, with less serious stresses on the working-parts; and this difference, again, makes it practicable to build the former at as small cost as the latter, when of equal power.

The latest type of river and sound side-wheel steamer is illustrated by the *Plymouth*, of the Fall River line, between New York and New England, traversing Long Island Sound.

The dimensions of the *Plymouth* are as follows:

	FEET.	INCHES.
Length over all-----	366	--
Length on water-line-----	351	8
Breadth over guards-----	87	--
Breadth of hull-----	50	--
Depth at lowest point of sheer-----	21	--
Draught of water, light-----	11	--
Distance from keel to top of deck-house on dome-----	59	3

The ship is constructed of iron, on the double-hull, bracket-plate and longitudinal system, securing safety against sinking or destruction by fire.



FALL RIVER LINE STEAMER "PLYMOUTH."

The *Plymouth* is fitted with a four-cylinder, double-inclined, triple-expansion, direct-acting engine of 5,500 indicated horse-power. The high-pressure cylinder, 47 inches diameter, takes steam at a pressure of 160 pounds per square inch. The intermediate cylinder is 75 inches in diameter. The high-pressure and intermediate cylinders are placed forward of the center of the shaft, and are connected to crank-pins placed at

right-angles. Aft the shaft are two low-pressure cylinders, each 81½ inches in diameter. One low-pressure is connected to the same crank-pin as the high-pressure cylinder, and the other to the same crank-pin as the intermediate cylinder. All pistons have a stroke of 8 feet 3 inches. Each of the two low-pressure cylinders is supplied with its own air-pump and surface-condenser, with independent centrifugal circulating pump.

The engine keelsons and frames are made of steel, strengthened in the usual manner with angles and intercostals. The wheels are of the feathering type, 30 feet diameter outside the buckets. Each wheel has 12 curved steel buckets, each being 4 feet wide and 13 feet 3 inches long.*

The most remarkable work yet performed in marine engineering is illustrated in the torpedo-boats and "torpedo-destroyers" built by Thornycroft, Yarrow, Herreshoff and other makers, some of which have been given speeds exceeding thirty knots an hour on their trial trips, notwithstanding the fact that they are small craft and thus "handicapped." The machinery of these little vessels exhibits the most wonderful concentration of power into small space, and with little weight, that has ever been seen in any department of engineering. Engines of three thousand and four thousand horse-power are condensed into the hulls of crafts 150 to 200 feet long, and weights are reduced to fifty pounds or less per horse-power. In the earlier forms of these boats the locomotive type of boiler was employed; this is giving place, in the later, to the water-tube or sectional class used earlier in this century by Stevens, Albans and Perkins, with high-pressure steam. Triple-expansion engines are adopted commonly now, and their economy permits long distances to be traversed by these small crafts at half-speed or less. The largest classes of war-vessels have enormously powerful engines, but are not as remarkable for their power per ton or per cubic foot of space occupied. The United States ship *Columbia* has a displacement of 7,500 tons, and, exerting 23,000 horse-power, makes a speed at sea of 23 knots an hour—27 miles. The United States "battle-ships" have 11,000 tons displacement, but are of but one half the power of the *Columbia* and the *Minneapolis*, steaming, at full speed, 15 knots. British naval vessels have a maximum displacement of about 15,000 tons and a speed, as listed, of 18 knots; others of 14,000 tons and 25,000 horse-power attain 22 knots. The Cunard steamers *Campania* and *Lucania* are of 30,000 horse-power and 23 knots speed.

R. H. THURSTON.

MARINE GLUE. See GELATINE, Vol. X, p. 134.

MARINE HOSPITAL SERVICE. This is the medical bureau of the United States Treasury Department, which is charged with the duty of providing relief for the sick and disabled seamen and employees of the United States merchant marine, the management of the national quarantine, examination of the United States merchant marine

*Manual of the Steam Engine, Vol. I, p. 227.

pilots for color-blindness, examination of officers and men of the United States revenue-cutter service as to physical condition, examination of cadets of that service as to their fitness for appointment, physical examination of surfmen of the life-saving service as to their ability to perform the duties assigned them, and the physical examination of officers and crew of any United States merchant vessel whose master desires such examination. In 1884 the monthly tax on seamen was abolished and a tonnage tax substituted, which is now supplemented by a small annual appropriation.

Since the reorganization of the service in 1871, the surgeon-general has made annual reports to the Secretary of the Treasury, which give detailed statements of the operation of the service, describe interesting cases of diseases and injuries, and give other valuable information, especially in regard to quarantine, hygiene, hospital instruction, etc. The medical corps of the service consists of a supervising surgeon-general, a number of hospital surgeons, passed assistant surgeons, and assistant surgeons. Hospital stewards are assigned to duty at all the marine hospitals and larger stations, and are graded into three classes, according to efficiency. Acting assistant surgeons are on duty at stations where there are no marine hospitals and where but few seamen apply for relief. See also HOSPITALS, Vol. XII, p. 306.

MARINE INSURANCE IN THE UNITED STATES. The earliest record of marine insurance by citizens or corporations of the United States is found in an old marine policy issued at Boston, June 4, 1745, subscribed by five merchants of that city. The number of the policy, 1,155, would indicate that a not inconsiderable number of transactions of this kind took place about that time, and evidently on the individual underwriting plan, after the manner of the Lloyds of London. It is probable that other limited transactions of this kind before the Revolutionary War took place, but if such was the case no reliable record has been discovered. The first authentic account of corporate marine insurance dates back to 1794, at Philadelphia, when the Insurance Company of North America was incorporated with a capital of \$600,000, which grew out of an association of capitalists called the "Universal Tontine Association," and which issued some marine policies two years before the organization of the Insurance Company of North America, which down to the present time has transacted a large marine business in connection with fire insurance. Four days later than the date of the above incorporation, the Insurance Company of the State of Pennsylvania was organized, and also transacted a marine business. In 1795 the Massachusetts Fire and Marine Insurance Company was organized in Boston, and a year later the New York Insurance Company, in New York City began as a mutual company, being organized as a stock company in 1798 and transacting the business of marine insurance. There followed at intervals several companies, some for marine business exclusively and

others for both fire and marine, at New York, Boston, Providence, Rhode Island, New Orleans and Philadelphia. Many of them had a short career, and a few have continued to the present day. Several of the British fire and marine companies which at various times during the past 45 years have established United States branches have written marine insurance, but of the mixed fire and marine companies only two transact a marine business in this county at the present time.

In the United States the inland-marine business is extensive; i.e., the insurance of vessels and cargoes on the great chain of lakes, and of steamers and freight on our rivers. With the exception of twelve foreign companies, British, Swiss and German, and half a dozen American companies, the companies engaged in marine insurance transact mainly an inland marine business. At San Francisco, however, for many years, foreign marine companies, Chinese, Swiss, British and German and one or two French companies, have done business exclusively at that port, the number varying from 20 to 28. In 1895 these companies, to the number of 27, wrote \$67,396,488 of marine risks, and collected \$535,800 in premiums. In 1890, the number of these companies being about the same, the risks written on the Pacific coast were about \$65,000,000 and the premiums about \$560,000. Five years earlier, in 1885, 25 companies wrote a little over \$38,000,000 and collected in premiums \$470,000; while in 1880 the 16 foreign marine companies wrote \$34,274,286 in risks and collected \$554,450 in premiums. Several American and some British and other foreign companies also have, for a period prior to 1880 and continuously since, done business in San Francisco, which are not included in the above, as we have included these in the general statistics for the entire United States which are to follow. Beginning with 1880, it will be found that, exclusive of the foreign business in California above given, the total marine and inland marine business of the United States, stated by five-year periods, has been about as follows:

YEAR.	NO. OF COMPANIES	RISKS WRITTEN.	PREMIUMS RECEIVED.
1880 -----	108	\$2,200,002,550	\$17,996,682
1885 -----	70	1,893,173,000	16,325,890
1890 -----	69	2,808,035,800	15,520,500
1895 -----	47	2,798,683,000	14,808,950

Of the above companies, from eight to twelve foreign and from five to eighteen American companies have done almost exclusively an ocean-marine business since 1880, the American companies gradually decreasing and the foreign companies more than holding their own. In 1880 there were about twenty-five companies, included in our enumeration, engaged in a limited inland-marine business, especially on the rivers, which were also doing a fire-insurance business, and soon abandoned the marine business, several before 1885 going out of business altogether. In 1890, 46 American and two Canadian companies

were engaged in the inland-marine business, while in 1895 the number had decreased almost one half, although the amount of business of this class was about as large as ever. The business has become concentrated in the hands of fewer companies, including some of the foreign companies. Including the marine business done at San Francisco, the total marine and inland-marine business in 1895 in the United States closely approximated \$2,865,000,000, on which the premiums were \$15,400,000. It will be seen by the variation of premiums received in the aggregate amount of risks written, that the rate charged has fluctuated considerably. For the four periods above named the average rate was 86 cents per each \$100 at risk in 1880; in 1885, 87 cents; in 1890, 60 cents, and in 1895, 52 cents.

At the present time American companies do not take kindly to the ocean-marine business, but, to the number of about twenty-five strong companies, engage very liberally in that of inland-marine in connection with a large fire-insurance business. A few small but cautious companies, in addition, write limited lines on this class of business, but the tendency is steadily toward the handling of the inland-marine business by a small number of companies as compared with a few years ago. In Canada, Canadian and British companies for a good while have transacted the business of inland-marine, and sometimes one or two American companies have also done a limited business there. In 1895, two Canadian, three British companies and one American company wrote in the Dominion \$25,395,155 of inland risks, and collected thereon \$76,345 in premiums.

A. H. HULING.

MARINE LEAGUE, a distance of three miles generally acknowledged as the shore distance over which the nations severally may have exclusive right upon the sea-water abutting against their respective coasts. With respect to the limitation of jurisdiction on the sea-coast, there are two principles universally admitted: 1. That the sea is open to all nations; and 2. That there is a portion adjacent to every nation over which the sovereignty of that nation may rightly extend, to the exclusion of every other political claim.

It is difficult, in many cases, to define the limits of these waters.* Such portions as harbors and waters above low-water mark are recognized as within the *lex loci*, and those persons on board of ships are subject to the local laws and regulations as fully as if they were residing on the land. With reference to parts more seaward, the question is more complicated. The cannon-shot limit is the popular rule. For all practical purposes, this is the marine league of three miles. The United States and Great Britain have agreed to this claim as between themselves, but other nations have not. Norway specified in one case four miles, England six miles under an act of George IV, and again twelve miles under the

Hovering Acts (q.v., in these Supplements). The United States, in 1875, claimed the same for revenue purposes, and even as far as the Gulf Stream for the exclusion of belligerents. Spain claimed a six-mile belt around Cuba. Great Britain has been granted, by China, jurisdiction over British subjects on vessels up to one hundred miles from the coast of China. The question of jurisdiction over bays has been much disputed. St. George's Channel has diplomatically been acknowledged to be British territory, and the Bay of Newfoundland has been legislated for as if British territory. Generally speaking, however, the three-mile limit is acknowledged as the limit. Foreigners have a right of user of such waters, subject to definite limitations. Belligerent acts must not be carried on there; piracy and smuggling can be stopped and quarantine regulations enforced. The one general rule, is that the state may exercise any rights over these waters in defense of itself and its own interest, or in maintaining the right of free passage to all others.

MARINETTE, a city and the capital of Marinette County, northeastern Wisconsin, on Green Bay, at the mouth of the Menominee River, opposite Menominee, Michigan, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. The chief business is lumbering, iron-mining and pulp and paper making. The town contains saw and planing mills, and iron-works. It has an excellent harbor, improved by the United States government at a cost of \$275,000. The river is spanned here by two bridges. It also is supplied with city water, electric lights and street-railways, and with several parks. It has a large lake traffic. Population 1890, 11,523; 1895, 15,286.

MARINO. In 1872 the republic of Marino concluded a treaty of protective friendship with Italy. The treaty was abrogated by the Italian government in 1895. The state has no public debt and its annual revenue and expenditure average about 227,000 lire. Population 1891, 8,200. See also SAN MARINO, Vol. XXI, pp. 266, 267.

MARIO, GIUSEPPE, an Italian tenor; by birth the Cavaliere di Candia, and son of General di Candia; born at Cagliari in 1810. He served in the army for some years, but was obliged to leave Italy on account of a youthful escapade, and went to Paris, where, having contracted debts, he accepted the appointment of first tenor of the opera, with a salary of 1,500 francs per month, changing his name, at the same time, from Di Candia to Mario. He made his *début* as Robert in *Robert le Diable*, and achieved the first of a long series of operatic triumphs in Paris, London, St. Petersburg and America. By the famous singer, Giulia Grisi, he was the father of six daughters. In his later years he lost his fortune through disastrous speculations. In May, 1878, a benefit concert in London yielded him as much as \$5,000. He died in Rome, Dec. 11, 1883.

* See *Government Year-Book*, edited by Lewis Sargent, 1889; and *Commentaries on International Law*, by Sir Robert Filmore.

MARIOLATRY. See MARY, Vol. XV, pp. 590-592.

MARION, a town and the capital of Perry County, western central Alabama, 22 miles N.W. of Selma, on the Southern railroad. It is in an agricultural region, and has railroad repair-shops and a carriage factory. It is the seat of Marion Military Institute and of two seminaries for women,—Marion (non-sectarian, 1836) and Judson (Baptist, 1839). Population 1890, 1,982.

MARION, a city and the capital of Williamson County, southern Illinois, 50 miles N.N.E. of Cairo, on the Chicago, Paducah and Memphis and the St. Louis, Alton and Terre Haute railroads. It is in a fertile farming and live-stock raising region, and has a large shipping trade in grain, tobacco and live-stock. It has flour, woolen and cotton mills. In the vicinity are large coal-mines. Population 1890, 1,338.

MARION, a city and the capital of Grant County, northeastern central Indiana, 60 miles N.N.E. of Indianapolis, on the Mississinewa River, and on the Pittsburg, Cincinnati, Chicago and St. Louis, the Cleveland, Cincinnati, Chicago and St. Louis and the Toledo, St. Louis and Kansas City railroads. It contains wood-working factories, flax factories, a foundry and flour-mills. Population 1890, 8,769.

MARION, a city and the capital of Linn County, central eastern Iowa, 58 miles S.W. of Dubuque, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It is in an agricultural and stock-raising region, and contains foundries, factories and mills for the manufacture of lint, flour, beer, carriages, furniture and farm implements. Population 1890, 3,094; 1895, 3,768.

MARION, a city and the capital of Marion County, eastern central Kansas, 48 miles N.N.E. of Wichita, on the Cottonwood River, and on the Atchison, Topeka and Santa Fé and the Chicago, Rock Island and Pacific railroads. It is in a fruit and stock raising region, and has springs of medicinal value. It is a trade center, and has an iron foundry and flour-mills. Population 1890, 2,047; 1895, 2,077.

MARION, a city and the capital of Marion County, central Ohio, 40 miles N. of Columbus, on the New York, Lake Erie and Western and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It contains grain-elevators, machine-shops and manufactories of carriages, wagons, rakes, steam-shovels, malleable iron, thrashers, engines, sulkies and chains. Population 1890, 8,327.

MARION, a town and the capital of Marion County, eastern South Carolina, 56 miles E.N.E. of Sumter, on Cat Fish Creek, and on the Atlantic Coast Line railroad. It is the trade center of a cotton region. Population 1890, 1,640.

MARION, a town and the capital of Smyth County, western Virginia, 145 miles W. of Lynchburg, in the Blue Ridge Mountains, on the Norfolk and Western railroad. It is in a cattle-raising and mining region, and has manufactories of iron and

of pigments from barytes, of agricultural implements and castings. It is the seat of Marion Female College and of the Southwestern Lunatic Asylum. Population 1890, 1,651.

MARIOTTE'S LAW. See ATMOSPHERE, Vol. III, p. 35.

MARIOTTI. See GALLENGA, in these Supplements.

MARIPOSA LILY, a name sometimes given to species of the genus *Calochortus*, lily-like plants of the western United States and Mexico. The genus contains thirty or forty species, most of which bear large and brilliant terminal flowers. The genus is a favorite with horticulturists, who have produced from it a number of showy hybrids.

MARIPOSAN INDIANS, a linguistic stock of American Indians including a number of small tribes, the principal divisions being the Cholonvone and Yokuts. They formerly occupied the country south of the Fresno River, California, as far as the Mojave Desert. They always were considered a peaceful tribe. They have rapidly decreased in numbers, numbering in 1850 about three thousand, and in 1895 about one hundred and sixty. They are under the mission agency in California.

MARITIME LAW. See SEA LAWS, Vol. XXI, pp. 583-586.

MARITZA, the ancient Hebrus, a river of eastern Roumelia and Turkey, rising in the Balkan Mountains and flowing east past Adrianople, then turning south-southwest and flowing into the Ægean Sea. Its length is 272 miles. It is too much obstructed by sand-bars and rocks to be of service for navigation by large boats; river-boats, however, ascend to Adrianople. It is a great fertilizing agent of the plain of Philipopolis, through which it flows.

MARJORAM. See HORTICULTURE, Vol. XII, p. 289.

MARK, a German coin. See MONEY, Vol. XVI, p. 732.

MARKET DRAYTON. See DRAYTON-IN-HALES, in these Supplements.

MARKET GARDENS OF THE UNITED STATES. See AGRICULTURE, in these Supplements.

MARKET OVERT. See *Personal Estate*, under SALE, Vol. XXI, p. 207; and *Stolen Goods*, under THEFT, Vol. XXIII, p. 233.

MARKHAM, CLEMENTS ROBERT, an English naval officer, geographer and author; born at Stillingfleet, England, July 20, 1830; educated at Westminster; entered the navy in 1844; in 1851 left the navy, and in 1855 became a clerk in the Board of Control. In 1863 he was elected secretary of the Royal Geographical Society, and in 1867 became assistant secretary in the Indian Office. In 1868 he was placed in charge of the geographical department in that office. He served in the Arctic expedition in search of Sir John Franklin; explored Peru and the forests of the eastern Andes; introduced the cultivation of the cinchona plant from South America into India; served as geographer in the Abyssinian

expedition, and was present at the storming of Magdala. His numerous publications include



CLEMENTS R. MARKHAM.

MARKS, HENRY STACY, a British artist; born in London, Sept. 13, 1829. He studied at the Royal Academy, under Picot, in Paris, and at L'École des Beaux-Arts. His first picture, after returning to England, appeared at the Royal Academy in 1853. In 1878 he became a Royal Academician. Among his numerous paintings are *Christopher Sly* (1855); *A Day's Earnings* (1858); *Dogberry's Charge to the Watch* (1859); *Jolly Post-Boys* (1875); *Convocation* (1878); and *Hermit and the Pelicans* (1888).

MARLBORO, a city of Massachusetts. It has over twenty large shoe factories. Its public library has 12,000 volumes. The city is supplied with gas and electric lights and an electric railway. Population 1890, 13,805; 1895, 14,977. See also MARLBOROUGH, Vol. XV, p. 553.

MARLBOROUGH (CHARLES RICHARD JOHN SPENCER CHURCHILL) DUKE OF, the ninth of the title; born 1871; Nov. 6, 1895, married Miss Consuelo Vanderbilt, daughter of William K. Vanderbilt. See also MARLBOROUGH, Vol. XV, p. 552.

MARLIN, a town and the capital of Falls County, eastern central Texas, 18 miles S.E. of Waco, on the Waco and North-Western railroad, two miles E. of the Brazos River. It is in a cotton and live-stock raising region. It has two seminaries. Population 1890, 2,058.

MARLITT, E., the pseudonym of JOHN, EUGENIE; q.v., in these Supplements.

MARLOWE, JULIA. See TABOR, JULIA MARLOWE, in these supplements.

MARMADUKE, JOHN SAPPINGTON, an American publicist; born in Missouri, near Arrow Rock, March 14, 1833; graduated at West Point in 1857, and served in Utah and New Mexico under Gen. A. S. Johnston. Like his general, he joined the Confederacy and was made colonel of the Third Confederate Infantry. He fought with gallantry at Shiloh, and was wounded in the second day's fight. Afterward he took part in the campaigns of Mississippi and Arkansas, and was made a major-general for his services against General Banks. He was captured in Missouri, in October, 1864, and held a prisoner of war at Fort Warren, Boston, until August, 1865. In 1875 he was appointed railway commissioner, and in 1884 was elected governor of Missouri. He died in Jefferson City, Missouri, Dec. 28, 1887.

MARMORA, SEA OF. See BLACK SEA, Vol. III, p. 797.

MARMORA (ALBERT FERRERO), CONTI DELLA, a Sardinian geologist and general, was born in Turin, Italy, in 1789. He joined the French army and gained distinction during Napoleon's campaigns (1808-14), but becoming involved in political disturbances was banished from France in 1821. He returned to Sardinia and devoted himself to a study of the geology and the physical features of the island. The result of his labors appeared in *Travels in Sardinia*, a statistical, physical and political description of that island (3 vols., 1831). He was elected member of the Academy of Sciences, Turin; in 1840 became major-general in the Italian army; a senator in 1848; a lieutenant-general in 1849. He died in 1863.—His brother, ALPHONSO FERRERO, Marchese della Marmora, was born in Turin, Nov. 18, 1804. He was educated in the military school of Turin and became an officer and instructor in the Sardinian army. He took part in the Austrian war of 1849, and the following year was appointed Minister of War by King Victor Emmanuel. He improved the efficiency of the army, and during the Crimean war led his Sardinian troops to victory at Tchernaya, Aug. 15, 1855. He was appointed general (1856); commander-in-chief (1860); Premier of the Cabinet (1864); minister to Paris (1867); viceroy of Rome (1870). In 1873 he published some sensational documents under the title *Un Po' Piu di Luce*, in which he charged Bismarck with the attempt to purchase an alliance with France by the cession of territory on the Rhine, a charge vigorously denied by the German government. He died in Florence, Jan. 5, 1878.

MARMOSET. See APE, Vol. II, p. 154.

MARNIX, FILIPS VAN, Lord of St. Aldegonde. See HOLLAND, Vol. XII, pp. 92, 93.

MARONI RIVER. See GUIANA, Vol. XI, p. 251.

MAROS RIVER, a stream of eastern Hungary, rising in the eastern Carpathians, and flowing with a very irregular but generally western course, to the Theiss, which it joins near Szegedin. It is a great commercial route, being navigable as far as Ujvar, a distance of 228 miles. Total length, 400 miles.

MARQUE, LETTERS OF. See PRIVATEER, Vol. XIX, p. 764.

MARQUETRY OR MARQUETERIE. See BUHL-WORK, Vol. IV, 446.

MARQUETTE, a city of Michigan, notable as a summer resort. It has an excellent harbor, and is an important shipping-point. It has two public libraries, iron-mines, brown-sandstone quarries and large lumber interests. Population 1890, 9,093; 1894, 9,724. See also MARQUETTE, Vol. XV, p. 565.

MARQUEZ, JOSÉ ARNALDO. See PERU, Vol. XVIII, p. 676.

MARRIAGE LAWS IN THE UNITED STATES. In most of the states of the United States laws have been enacted prescribing the method required to solemnize a marriage, the minimum age at which marriage is legal, the age at which marriage licenses

may be issued without consent of parents, the degrees of consanguinity which will render marriage illegal, and the circumstances which will render it void or voidable. These provisions are in many respects uniform, while in others they vary widely in the different states. In most states, while a marriage license is required by law, and persons under certain ages, usually under the age of majority, are prohibited from marrying except upon the consent of their parents, yet marriages, when consummated without complying with these provisions, are nevertheless valid, and the only effect is to make those who have violated the law liable to punishment for the offense.

The policy of the law throughout the United States is to sustain the validity of marriages in almost all cases, when the persons have reached the age of puberty and are free from other matrimonial ties.

Marriages legally performed in other countries will receive full recognition in the United States, unless they be incestuous or polygamous. The different states will also fully recognize a marriage consummated in another state, between parties who were at the time citizens thereof, even if such marriage would be void under its own laws.

As to the laws of particular states, it may be said, generally, that all states require the procurement of a marriage license from the officer of the county authorized by law to issue them, except the states of New York, South Carolina and Wisconsin. The age prescribed by statute in the various states at which marriage may be legally performed without the necessity of obtaining the consent of parents, and the age below which it is illegal in any event, together with the degrees of consanguinity and affinity within which marriage is prohibited, are given in the subjoined table. In many states, however, the provisions rendering marriages illegal under conditions named are such as to make such marriages voidable only, and not absolutely void. The only circumstances under which marriages are universally held to be void are, when the parties are related to each other within the degrees prohibited by law so as to render the marriage incestuous, and when one of the parties has another husband or wife living at the time of the marriage. But in the case of a bigamous marriage the offense is not punishable if the prior husband or wife has been absent and not heard from for a period of time sufficient to raise a legal presumption of death.

In the following states, marriages between persons, one or both of whom are below the age at which marriage, with the consent of parents, is legal, are declared, by statute, to be void: Arkansas, Connecticut, Kansas, Kentucky, Massachusetts, Michigan, New Mexico, Utah, Virginia and West Virginia. In other states, such marriages are held merely voidable, at the option of the person under disability; and it is probable that such will also be the holding of the courts in some of the states above named, and if the parties continue to cohabit as husband and wife after reaching the age at which marriage is lawful, the courts will recognize the marriage as valid. In the states of Alabama, Arizona, Arkansas, California, Colorado, Delaware, Florida, Geor-

gia, Idaho, Indiana, Kentucky, Louisiana, Maine, Mississippi, Missouri, Nebraska, North Carolina, Oregon, South Carolina, Tennessee, Texas, Utah, Virginia and West Virginia, marriages between white persons and negroes are declared to be void. The portion of negro blood which will render a person a negro, within the meaning of these acts, is variously fixed from one eighth to one fourth. In some of the states above named this prohibition is extended to include whites and Mongolians. In all states other than those above named such marriages are valid.

In Delaware, District of Columbia, Georgia, Illinois, Indiana, Kansas, Kentucky, Maine, Massachusetts, Michigan, Nebraska, Ohio, Rhode Island, South Carolina, Utah, and West Virginia, marriages are said to be void when one of the parties is an idiot or insane person, and in other states such marriages are voidable. Impotency will also render a marriage void in Georgia, Iowa, Maryland and Texas, while in other states it will only make them voidable. In Maine and Massachusetts, marriages solemnized between parties who go to another state to marry, for the purpose of avoiding the law, are declared to be void. In Alabama, if one of the parties has been guilty of the crime against nature, the marriage is voidable, at the option of the other.

Pregnancy of a woman at the time of the marriage, by another than her husband, renders the marriage voidable, at the instance of the husband, in Kansas, Maryland, Tennessee, Virginia, West Virginia and Wyoming.

In most of the states no particular method of solemnizing a marriage is absolutely essential, although in many states one or more methods are established by statute as proper and sufficient. Usually, when an unmarried man and woman cohabit as husband and wife for such a length of time as to create the conditions and relations of husband and wife, the law will treat them as married. Such marriages, when no ceremony of marriage had been performed, are termed common-law marriages, and are valid in most states.

The above provisions as to the laws of the various states are only general, and many exceptions and modifications, too numerous and intricate to be here given, will be found upon examination of the statutes.

Any careful study of the marriage laws of a particular state must be made from the statutes and courts decisions of the state in question. This is especially true as to whether certain conditions will render a marriage void or voidable, as these questions are the subject of constant change by legislation, acts and various constructions by different courts.

The question of uniformity of Marriage Laws has moved twenty-eight states to create commissions on the subject (see DIVORCE, in these Supplements). The creation of the commissions has naturally moved slowly. To get them at all, no salary or pay except for expenses could be attached to the office. Almost invariably the members are lawyers. Some useful recommendations for uniformity in Marriage and Divorce laws have been made, and laid before the legislature.

STATE.	MINIMUM AGE FOR MARRIAGE WITH CONSENT OF PAR- ENTS.		MINIMUM AGE FOR MARRIAGE WITH- OUT CONSENT OF PARENTS.		DEGREES OF CON- SANGUINITY WITH- IN WHICH MAR- RIAGE IS NOT PER- MITTED.		DEGREES OF DIRECT AFFINITY WITHIN WHICH MARRIAGE IS NOT PERMIT- TED.	
	Male.	Female.	Male.	Female.	Linear.	Collateral.	Ascending.	Descending.
Alabama	17	14	21	18	2	*3	2	2
Arizona	18	16	21	18	all	*3	—	—
Arkansas	17	14	21	18	all	*3	—	—
California	18	15	21	18	all	*3	—	—
Colorado	14	12	21	18	3	*3	—	—
Connecticut	14	12	21	21	2	3	1	1
Delaware	18	16	21	18	2	3	2	2
Dist. of Columbia	14	12	21	16	2	3	2	2
Florida	14	12	21	21	all	3	—	—
Georgia	17	14	—	18	3	3	1	2
Idaho	14	12	18	16	all	*3	—	—
Illinois	17	14	21	18	all	*3	—	—
Indiana	18	16	21	18	all	4	—	—
Iowa	16	14	21	18	2	3	1	2
Kansas	14	12	21	18	all	*3	—	—
Kentucky	14	12	21	21	2	3	2	2
Louisiana	14	12	21	21	all	*3	—	—
Maine	14	12	21	18	2	3	2	2
Maryland	14	12	21	16	2	3	2	2
Massachusetts	14	12	18	16	2	3	2	2
Michigan	18	16	21	18	2	3	2	2
Minnesota	18	15	21	18	all	3	1	2
Mississippi	14	12	21	18	2	*3	—	—
Missouri	15	12	21	18	all	*3	—	—
Montana	18	16	21	18	all	*3	—	—
Nebraska	18	16	21	18	2	*3	—	—
Nevada	18	16	21	18	all	*3	—	—
New Hampshire	14	13	—	—	2	*3	1	2
New Jersey	14	12	21	18	2	3	2	2
New Mexico	18	15	21	18	all	*3	—	—
New York	18	16	21	21	all	2	—	—
North Carolina	16	14	18	18	all	3	—	—
North Dakota	16	13	21	18	all	*3	—	—
Ohio	18	16	21	18	all	4	—	—
Oregon	18	15	21	18	all	*3	—	—
Oklahoma	14	12	18	15	all	*2	1	1
Pennsylvania	14	12	21	21	2	3	1	2
Rhode Island	14	12	21	21	2	3	2	2
South Carolina	14	12	21	21	2	3	2	2
South Dakota	18	15	21	21	all	4	—	—
Tennessee	14	12	—	—	all	3	—	—
Texas	16	14	21	18	2	3	1	2
Utah	14	12	21	18	3	3	—	—
Vermont	14	12	21	18	2	3	2	2
Virginia	14	12	21	21	2	*3	2	2
Washington	14	12	21	18	all	4	1	1
West Virginia	14	12	21	21	2	*3	—	—
Wisconsin	18	15	21	18	all	3	—	—
Wyoming	18	16	21	21	2	*3	—	—

MARRIED WOMEN. See HUSBAND AND WIFE, Vol. XII, pp. 400-402.

MARROW. See ANATOMY, Vol. I, p. 854.

MARRYATT, FLORENCE. See LEAN, MRS. FRANCES, in these Supplements.

MARS, a planet. See ASTRONOMY, Vol. II, pp. 804-806; and in these Supplements; also TIDES, Vol. XXIII, p. 379.

MARSDEN, SAMUEL, a British missionary, often

*When the relation is of the half-blood, marriage is prohibited within two degrees collateral consanguinity.

† Marriage between cousins is also prohibited.

styled the "Apostle of New Zealand." See NEW ZEALAND, Vol. XVII, p. 471.

MARSEILLAISE, THE. See ROUGET DE LISLE, Vol. XXI, p. 13.

MARSEILLES, a city of Lasalle County, north-eastern Illinois, 65 miles W.S.W. of Chicago, on the north bank of the Illinois River, on the Illinois and Michigan canal, and on the Chicago, Rock Island and Pacific railroad. It has an excellent water-power, obtained by a dam one thousand feet long across the river, has a foundry, and manufactories of paper, flour and agricultural implements. There are coal-mines in the vicinity. Population 1890, 2,210.

MARSH, ARTHUR RICHMOND, an American educator; born in Newport, Rhode Island, Oct. 3, 1861; graduated at Harvard, and from 1886 to 1889 was professor of English at the University of Kansas. He traveled in Europe from 1889 to 1891, and on his return became assistant professor of comparative literature at Harvard. He wrote numerous articles and reviews in the *American Journal of Archaeology*, *Nation*, *Andover Review*, etc.

MARSH, OTHNIEL CHARLES, an American naturalist; born at Lockport, New York, Oct. 29, 1831; graduated from Yale Scientific School in 1862, and passed the following three years pursuing his studies in the universities of Berlin, Heidelberg and Breslau. In 1866 he became professor of palæontology in Yale. He made a specialty of the study of extinct vertebrate animals, and for the purpose of research headed numerous exploring expeditions into the Rocky Mountain region, resulting in the discovery of more than one thousand new species of vertebrates, many of which represent entirely new orders. His published reports include *Odontornithes* (34 plates, 1880); *Dinocerata* (56 plates, 1884); *Sauropoda* (90 plates, 1894). Professor Marsh, in 1878, was president of the American Association for the Advancement of Science; in 1882 was appointed vertebrate palæontologist of the United States Geological Survey, and became president of the National Academy of Sciences in 1883. See also BIRDS, Vol. III, p. 727; and SAUROPSIDA, Vol. XXI, p. 323; and SIRENODON, Vol. XXII, p. 96.



OTHNIEL CHARLES MARSH.

MARSHALL, a city and the capital of Clark County, central eastern Illinois, 15 miles S. of Paris, on the Terre Haute and Indianapolis and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in a grain and stock-raising region, and has several woolen, planing and flour mills. It has a considerable trade. Population 1890, 1,900.

MARSHALL, a city and the capital of Calhoun County, central southern Michigan, 30 miles E. of Kalamazoo, on the Kalamazoo River, and on the Cincinnati, Jackson and Mackinac and the Michigan Central railroads. It has the repair-shops of the Michigan Central railroad, a large carriage fac-

tory, and manufactories of plows, wind-mills, carpets, bicycles, school furniture, and stoves and furnaces. Population 1890, 3,968; 1895, 4,599.

MARSHALL, a village and the capital of Lyon County, southwestern Minnesota, 27 miles S.W. of Granite Falls, on the Redwood River, and on the Chicago and North-Western and the Great Northern railroads. It is in an agricultural and stock-raising region. It has steam roller-process flour-mills and ships large quantities of pork, beef, wheat and flax. Population 1890, 1,203; 1895, 1,744.

MARSHALL, a city and the capital of Saline County, northwestern central Missouri, 74 miles E. of Kansas City, on the Chicago and Alton and the Missouri Pacific railroads. It is in a fine agricultural region, where anthracite coal and building-stone abound. It has carriage factories, a cannery and salt springs. It is the seat of Missouri Valley College, a Cumberland Presbyterian co-educational school, founded in 1889, which in 1896 had 13 instructors, 280 students and a library of 1,800 volumes. It also contains St. Xavier's Academy (Roman Catholic) and a convent. Population 1890, 4,297.

MARSHALL, a city and the capital of Harrison County, northeastern Texas, 143 miles E. of Dallas, on the Texas and Pacific and the Paris, Marshall and Sabine Pass railroads. It is in a cotton, livestock and lumbering region, and has the car-shops of the Texas and Pacific railroad, foundries, car-wheel works, a plow factory, cotton-gin factory, ice factory, saw and planing mills, a cotton-compress, wood-working and furniture factories. In the vicinity is abundant oak and pine timber, mineral springs, and there are also deposits of iron. Wiley University (Methodist), a co-educational institution founded in 1873, is situated here; in 1896 it had 12 instructors, 284 students and 1,800 volumes in its library. Bishop's College (Baptist) and a non-sectarian institute for women are also situated here. Marshall has an artesian-well water-supply and several banks and newspapers. Population 1880, 5,624; 1890, 7,207.

MARSHALL ARCHIPELAGO. See MICRONESIA, Vol. XVI, pp. 256, 257.

MARSHALL, ALFRED, an English political economist; born in 1842; educated at Merchant Taylors' School and the University of Cambridge. In 1868 he became lecturer on moral science at St. John's College, Cambridge, and in 1877 was appointed principal of University College, Bristol. In the latter year he married Miss Paley, with whom, in 1879, he published the *Economics of Industry*. After spending two years abroad he became, in 1883, lecturer on political economy at Balliol College, Oxford, and the following year, upon the death of Professor Fawcett, succeeded him in the chair of political economy at Cambridge. Besides the work mentioned Professor Marshall published *The Principles of Economics* (1890-91).

MARSHALL, HUMPHREY, an American diplomat and soldier; born in Frankfort, Kentucky, Jan. 13, 1812; graduated at West Point in 1832, and after serving in the Black Hawk expedition, resigned to become a lawyer. He was sent to Congress twice

from his native state; served as colonel of cavalry in the Mexican War; was minister to China from 1852 to 1854; and at the outbreak of the Civil War, although opposed to secession, entered the Confederate service with the rank of brigadier-general. He resigned to become a member of the Confederate Congress; and after the war practiced law in Richmond and Louisville. He died in Louisville, March 28, 1872.

MARSHALL, THOMAS ALEXANDER, an American jurist; born in Woodford County, Kentucky, Jan. 15, 1794; graduated at Yale in 1815, and later studied law. He began the practice of law in Frankfort, Kentucky, and in 1819 removed to Paris, Kentucky. In 1827-28 he was a member of the legislature, and from 1831 to 1835 was in Congress. From 1835 to 1856 he was judge of the court of appeals, and from 1836 to 1849 was professor in the law school of Transylvania. In 1866-67 he was chief justice of the court of appeals. He died in Louisville, Kentucky, April 17, 1871.

MARSHALL, WILLIAM CALDER, a Scotch sculptor; born in Edinburgh in 1813. After studying art in Edinburgh, London and Rome, he settled in London in 1839; was elected an associate of the Royal Academy in 1844 and an academician in 1852. His design for a monument to the Duke of Wellington at St. Paul's Cathedral obtained a prize in the competition of 1857, and much of his work is to be seen in the new Parliament houses, where his statues of Somers and Clarendon were placed. Among his other works are *The Broken Pitcher* (1842); *Psyche* (1868); *The Prodigal Son* (1877); and *Sabrina*. He died June 16, 1894.

MARSHALLTOWN, a city of central Iowa. It has a high school, railway-shops, flour and oil mills, foundries, large grain-elevators, soap and pickle factories, machine-shops, pork and beef packing-houses and two factories for making steel fencing-wire. Its trade in wheat and flour is considerable. See also MARSHALLTOWN, Vol. XV, p. 574. Population 1880, 6,240; 1890, 8,914; 1895, 10,047.

MARSHFIELD, a town of Coos County, southwestern Oregon, on Coos Bay, three miles E. of Empire, and on the Coos Bay, Roseburg and Eastern railroad. It has regular steamboat connection with San Francisco; is in a coal and lumber region, and has four saw-mills, a box and barrel factory, a tannery, and ship-building interests. Population 1890, 1,461; 1896, about 2,000.

MARSHFIELD, a city of Wood County, central Wisconsin, 78 miles E. of Eau Claire, on the Chicago, St. Paul, Minneapolis and Omaha, the Chicago and North-Western and the Wisconsin Central railroads. It is in a farming and grazing district, has machine-shops and lumber-mills, and manufactories of furniture, beer barrels and kegs, staves, veneers, etc. It contains a water-cure sanatorium, public and parochial schools, and St. Joseph's Hospital. Population 1890, 3,450; 1895, 4,586.

MARSH-GAS. See METHYL, Vol. XVI, p. 194.

MARSH HARVESTER. See HARVESTING MACHINERY, in these Supplements.

MARSH-HAWK. Same as HARRIER, Vol. XI, pp. 491, 492.

MARSH-HEN, a name given to certain game-birds of the genus *Rallus*, found in the United States. The salt-water marsh-hen is *R. crepitans*, and the fresh-water form is *R. elegans*. These birds are sometimes called "clapper-rails."

MARSH-MALLOW. See MALLOW, Vol. XV, p. 335.

MARSH-MARIGOLD. See MARIGOLD, Vol. XV, p. 544.

MARSH-ROSEMARY, a common name given to *Statice Limonium*, a genus of the family *Plumbaginaceae*, otherwise known as "sea-lavender." It grows along the coast in salt marshes, and has thick, pale leaves and scapes bearing panicles of lavender-colored flowers.

MARSILIA. See FERNS, Vol. IX, p. 105.

MARSIPOBRANCHII, a group of the lower vertebrates, formerly classed as fishes. The group includes the *Petromyzonids*, or "lampreys," and the *Myxinids*, or "hags." The term is equivalent to *Cyclostomi* and *Cyclostomata*. See also ICHTHYOLOGY, Vol. XII, p. 694.

MARSIVAN, a town of Asia Minor, in the vilayet of Sivas, 23 miles N.W. of Amasia, with a silvermine. It is noted for the hot carbonate of soda baths at Khooza, twenty miles north of the town, which are very beneficial for rheumatic complaints. Population, 11,000.

MARS-LA-TOUR, a French village on the road from Metz to Verdun, noted as the scene of a battle which took place during the Franco-Prussian war (Aug. 16, 1870). The engagement is also frequently called the battle of Vionville. See also BATTLE, Vol. III, p. 445; and WAR, Vol. XXIV, p. 347.

MARSTON, WESTLAND, a British dramatic poet; born in Boston, England, Jan. 30, 1820. In 1842 his *Patrician's Daughter*, a blank verse tragedy of the day, was brought out at Drury Lane by Macready. It was the first and also the most successful of more than a dozen plays. A collected edition of them, and his poetical works, appeared in two volumes in 1876. Besides these, he wrote a novel, a good book on *Our Recent Actors*, and a mass of poetic criticism. He died in London, Jan. 5, 1890.—His son, PHILIP BOURKE, a poet, was born in London, Aug. 13, 1850, and was blind from childhood. He was the subject of Hake's poem *The Blind Boy*, and Mrs. Craik's *Philip, My King*. After contributing a few poems to the *Cornhill Magazine* and other periodicals, he published his first volume of poems, entitled *Song-Tide* in 1870. This was followed by a second volume, entitled *All in All*, in 1875, and by a third, entitled *Wind-Voices*, in 1883. These poems gained for him the friendship of Swinburne and of Dante Gabriel Rossetti, who addressed to him a sonnet. Mr. Marston contributed poetical criticisms, essays and novelettes to various well-known periodicals. He died February 14, 1887.

MARSTON MOOR, BATTLE OF. See CROMWELL, Vol. VI, p. 599.

MARSTRAND, VILHELM NICOLAI, a Danish artist. See DENMARK, Vol. VII, p. 94.

MARSUPIALIA. See MAMMALIA, Vol. XV, p. 378.

MARSUS, DOMITIUS, a Roman poet of the Augustan age. Only fragments of his work, consisting of an epic, *Amazonis*, a treatise on wit, *De Urbanitate*, quoted by Quintilian, nine books of *Fabellae*, and his most celebrated production, a collection of epigrams, under the title *Cicuta*, are extant. For his epigrams, Martial speaks of him in terms of the highest praise. A beautiful epigram on the death of Tibullus remains. See also TIBULLUS, Vol. XXIII, p. 349, 350.

MARTEL DE JANVILLE, SYBILLE-GABRIELLE-MARIE-ANTOINETTE DE RIQUETTI DE MIRABEAU, a French novelist; born at Morbihan about 1850; in 1869 married Count Martel de Janville; began her literary career by the publication of sketches of life and manners contributed to *La Vie Parisienne*, assuming the pseudonym "Gyp," afterward retained by her. Her style is piquant and attractive, not wanting in fine humor, and withal marked by a subtle vein of moral feeling, which characteristics render her writings instantly popular with the class of readers addressed. Her works, which were rapidly issued, include *Petit Bob* (1882); *La Vertu de la Baronne* (1882); *Autour du Mariage* (1883); *Un Homme Délicat* (1884); *Elles et Lui* (1885); *Mademoiselle Loulou* (1888); *Bob au Salon* (1888); *C'est nous qui sont l'Histoire* (1890); *Passionette* (1891).

MARTELLO TOWERS, solid round towers for coast defense, about forty feet high, situated on the beach. They were so called because at Martello Point, in Corsica, a small round tower stood admirably a severe cannonade from an English fleet under Lord Hood in 1794. They were extensively erected in England at the end of the eighteenth century as a defense against French invasion, but are now regarded as obsolete.

MARTENSEN, HANS LASSEN, a Danish theologian; born in Flensburg, Aug. 19, 1808. He studied at the universities of Copenhagen, Berlin, Vienna, Munich and Paris, and was made professor of philosophy at Copenhagen in 1840, but afterward was transferred to the department of theology. In 1845 he became court preacher, and in 1853 was made bishop of Zealand. In 1840 he published a valuable monograph on *Meister Eckhart*, the German mystic, and nine years later laid the foundation of a European fame by a masterly work, from the conservative Lutheran standpoint, on *Christian Dogmatics*, in which, as a disciple of Hegel, he undertakes to reconcile faith and reason, revelation and science. In 1872 he published a *System of Christian Ethics*. He died in Copenhagen, Feb. 4, 1884.

MARTENSITE. See IRON AND STEEL, in these Supplements.

MARTHA'S VINEYARD. See MASSACHUSETTS, Vol. XV, p. 612.

MARTIAL LAW, the exercise of arbitrary power by the military authorities of a district or country wherein the ordinary administration has ceased to be operative, either on account of civil disturbance or because of the presence therein of a hostile force. It is not the same as "military law." The latter is the law which governs the army and soldiers at all times, but affects civilians only when they accompany a military force on active service. Martial law

is, in fact, no law at all, but simply the will of the supreme authority. No rules can be laid down for its application. The regulations of the United States army give some of the conditions under which martial law may be exercised and by which its functions are limited. In the United States, in time of peace, martial law must be declared by proclamation by the executive of the state or territory, or by the President of the United States, if there is a riot, insurrection or other disturbance. It is limited to the extent of the disturbed territory and the executive jurisdiction under the law. See also MILITARY LAW, Vol. XVI, pp. 295-299; and COURT-MARTIAL, Vol. VI, pp. 517-519.

MARTIN, BON LOUIS HENRI, a French historian; born in St. Quentin, Feb. 20, 1810. He wrote dramas and historical novels for a while, but about 1830 devoted himself to the writing of history, joining Paul Lacroix, "Bibliophile Jacob," in his project for a history of France in forty-eight volumes, consisting of extracts from historians and chronicles from the earliest period to 1830. He published the first volume in 1833, and thenceforward toiled alone at the vast undertaking, which was completed on a smaller scale in 1836. He then set himself to a still greater task, his *Histoire de France*. A third and much improved edition, containing a copious statement of the history and origin of the ancient Gauls, the development of the French language and literature, and the aspects of mediæval life and manners, earned the Gobert prize; the fourth edition was awarded by the Institution in 1869 the great prize of 20,000 francs. This work comes down only to 1789, yet it is one of the best works dealing in detail with the history of France. It shows impartiality and insight, is excellently arranged and admirably written. The continuation to the author's own time formed the less admirable *Histoire de France Moderne*. Martin acted for a time as mayor of one of the arrondissements of Paris, and was chosen Deputy for Aisne in 1871, and Senator in 1876. He was elected a member of the French Academy in 1878. He wrote several minor histories, such as the *Histoire de Soissons*; *Daniel Marín*; *Jeanne d'Arc*; *L'Unité Italienne*; and *La Russie d'Europe*. He died in Paris, Dec. 14, 1883.

MARTIN, HENRY NEWELL, a British scientist; born in Newry, Ireland, July 1, 1848; studied at University College, London, and took his B.A. degree at Cambridge, England, where he became a fellow of his college and lecturer on natural history. In 1876 he was invited to become professor of biology in the newly constituted Johns Hopkins University, at Baltimore. Professor Martin was a member of many scientific societies, a fellow of the Royal Society of England, and contributed largely to scientific journals, his special subject being biological research, particularly as applied to the heart and respiratory functions. He was associated with Thomas H. Huxley in the preparation of his *Practical Biology*, in 1876; the author of *The Human Body* (1881); and, in part, of a *Handbook of Vertebrate Dissection* (1881-84). Died Oct. 29, 1896.

MARTIN, HOMER DODGE, an American painter; born in Albany, New York, Oct. 28, 1836. With

the exception of a few weeks' study with William Hart in New York, he received no regular art-instruction, but began exhibiting at the National Academy in 1857. He was elected an academician in 1875, and in 1877 a member of the Society of American Artists. From 1876 to 1881 he traveled at intervals in England, and from 1882 to 1886 resided in France. Among his pictures, which are noted for quiet but effective color, are *Adirondacks* (1876); *Thames at Richmond* (1877); *Sand-Dunes on Lake Ontario* (1879); *High Tide at Villerville*; and *Lighthouse at Honfleur*. He died October 29, 1896.

MARTIN, LUTHER, an American lawyer; born in New Brunswick, New Jersey, Feb. 9, 1748. After graduating at Princeton, he studied law and settled at Somerset, where he obtained a large practice. In 1778 he was appointed attorney-general of Maryland, and in 1787 was sent as one of the Maryland delegates to the convention which framed the constitution of the United States. In 1804 he appeared as counsel for the defense in the impeachment of Samuel Chase before the United States Senate. A year later he resigned the attorney-generalship of Maryland, and in 1807 appeared as counsel for Aaron Burr in his trial at Richmond. From 1814 to 1816 he was chief judge of the court of oyer and terminer at Baltimore, and in 1818 again was appointed attorney-general of Maryland, but a stroke of paralysis in 1820 made him entirely dependent upon his friends. The Maryland legislature, in 1822, passed an act unparalleled in American history, requiring every lawyer in the state to pay annually a license fee of five dollars, the entire proceeds to be paid over to the trustees, "for the use of Luther Martin." His last days were spent in New York City, at the home of Aaron Burr, where he died, July 10, 1826.

MARTIN, SIR THEODORE, an English author; born in Edinburgh in 1816; received his education at the high school and at the university of his native city. He first became known as an author by his contributions to *Fraser's Magazine* and *Tait's Magazine*, under the signature of "Bon Gaultier"; and in conjunction with Professor Aytoun he composed the *Book of Ballads* which bears that pseudonym, and a volume of translations of the *Poems and Ballads of Goethe* (1858). His metrical translation of the *Odes of Horace* appeared in 1860, and was republished in the United States. In 1880 he completed the *Life of the Prince Consort*, in recognition of which he was knighted by Queen Victoria, and toward the close of the same year was elected rector of the University of St. Andrews. In 1882 he completed his Horatian labors by a translation of Horace's works, with a life and notes, in two volumes.—His wife, HELEN FAUCIT, an English actress; born in 1819, and went upon the stage in 1836, taking rank shortly as an artist of the very first class. In the character of Julia, in *The Hunchback*, she achieved great success, and became a leading member of Macready's companies during the period of his Shakespearean revivals. She was the original representative of the heroines in Bulwer's *Lady of Lyons* and *Richelieu*. After her marriage in 1851 she appeared upon the stage only at

intervals, her last appearance being in 1879, in the character of Beatrice, at the opening of the Shakespeare Memorial Theatre at Stratford-on-Avon. In 1885 she published her studies *On Some of Shakespeare's Female Characters*.

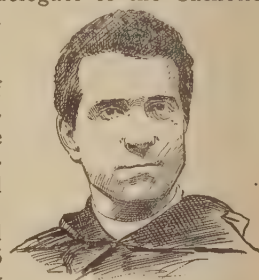
MARTIN, WILLIAM ALEXANDER PARSONS, an American missionary; born in Livonia, Indiana, April 10, 1827; graduated at Indiana State University in 1846, and at the Presbyterian Theological Seminary of New Albany, Indiana (now McCormick, Chicago), in 1849. He became missionary, under the Presbyterian Board, at Ningpo, China, where he remained ten years, and in 1858 acted as interpreter for the United States minister, in negotiating the treaty of 1858 with China. In 1863 he founded the Presbyterian mission at Peking, and was in charge till 1868. In 1869 he became president of Tungwên College of Peking, and professor of international law. He was the adviser of Chinese officials in questions of international law, notably in the conflict with France in 1884-85. In 1880-81 he was sent by China to Europe and the United States to report on methods of education, and in 1885 was made a mandarin of the third rank. Dr. Martin published, in English, *The Chinese: Their Education, Philosophy and Letters* (1881). In French, he published papers in the transactions of various learned societies of Europe. In Chinese his works include *Evidences of Christianity* (1885); *Religious Allegories* (1857); and translations of Woolsey's *Introduction to the Study of International Law* (1875); and of De Martin's *Guide Diplomatique* (1879).

MARTIN DE MOUSSY, JEAN ANTOINE VICTOR, a French traveler and physician; born in Moussy le Vieux, June 26, 1810; studied medicine in Paris, and, after serving as army health commissioner, went to South America in 1841, settling the following year in Montevideo, Uruguay, where he practiced his profession with success. During the war known as the "nine years' siege," from 1843 to 1852, he was medical director of the French and German legions raised in the city. Martin then began a survey of the River Plata, and from 1855 till the end of 1858 traveled through South America, making a survey of the Plata, Uruguay and Paraguay rivers. At his own expense he established a meteorological observatory, which he presented to the city of Montevideo. Owing to failing health, he returned in 1859 to Paris, where he published *Description Géographique et Statistique de la Confédération Argentine* (1860-64). He died at Bourgl-Reine, near Paris, March 26, 1869.

MARTINEAU, JAMES, an English theologian, brother of Harriet (q.v., Vol. XV, p. 583); born in Norwich; April 21, 1805. He was educated at the grammar school of his native city, and at Manchester New College. He entered the Unitarian ministry in 1828, and after officiating for some years in Dublin and Liverpool was appointed professor of mental and moral philosophy at Manchester New College. He removed to London when that institution was transferred thither in 1857. He became principal of the college in 1868, and held the office until his retirement in 1886. He was recognized for fifty years as one of the profoundest

thinkers and most effective writers of his day. He received the degree of LL.D. from Harvard in 1872, of D.T. from Leyden in 1875, of D.D. from Edinburgh in 1884, of D.C.L. from Oxford in 1888, and of Lit. D. from the University of Dublin in 1892. He was a voluminous writer on ethical and theological questions, and was master of a most lucid and graceful style. Among the best known of his works are *Studies of Christianity* (1858); *Essays, Theological and Philosophical* (1866-68); *Religion and Modern Materialism* (1874); *Study of Religion* (1888); *The Seat of Authority in Religion* (1890); *Essays, Reviews and Addresses* (1890-91).

MARTINELLI, SEBASTIAN, archbishop of Ephesus and apostolic delegate to the Catholic Church in America; born in the parish of St. Anna, near Lucca, Italy, Aug. 20, 1848; the brother of the late Cardinal Tommaso Martinelli. He studied for the priesthood and was admitted into the order of St. Augustine in 1871, and from that time until 1886 was professor of theology in the Irish Augustinian College in Rome. In 1889 he was appointed general of the Augustinian order. In 1893 he spent several months in the United States, reorganizing the American branch of his order. In 1896 he was selected by the Pope as delegate and the Vatican representative in America, in succession to Cardinal Satolli.



ARCHBISHOP MARTINELLI.

MARTINEZ, a town and the capital of Contra Costa County, western central California, 21 miles N.E. of San Francisco, at the entrance of Suisun Bay, on the Southern Pacific railroad. It is in a rich grain, nut and fruit region, and has a delightful climate. It ships grain directly to Europe and fruit to the East. There are sandstone-quarries, and copper, coal and quicksilver mines in the vicinity. Twelve miles to the southwest is Mount Diablo, 3,985 feet in height, which commands a magnificent view, including the Golden Gate, San Francisco, and all the beautiful mountain and water scenery for over 100 miles around. Population 1890, 1,600.

MARTINEZ CAMPOS, ARSENIO, a Spanish general and statesman; born in Segovia, Dec. 14, 1834; left the staff school at Madrid with the rank of lieutenant; went through the campaign in Morocco in 1859, as a member of the staff of the commander-in-chief, O'Donnell, and there was promoted to the rank of major. He afterward fought under Prim in Mexico, and from 1869 to 1872 served against the revolutionists in Cuba, and soon after his return was made mariscal de campo and captain-general of Valencia. For his services against the Carlists he was promoted to lieutenant-general. In conjunction with General Jovellar he made the military pronunciamiento of Sagasta, which gave the throne of Spain to Alfonso XII. He brought the civil

war to a close by the defeat of Don Carlos at Pena de Plata, in March, 1876. The high dignity of captain-general of the army was the recompense for his signal services. A year afterward he was appointed commander-in-chief of the army in Cuba, which the rebels had held in check for seven years, and in a short time put an end to the revolution in that island, more by conciliation than by arms. On his return to Spain, General Martinez Campos accepted the portfolio of war and the presidency of the council, March 7, 1879, and endeavored to procure the fulfillment of the promises made to the Cubans; but not obtaining the support of the Cortes, he resigned, and was succeeded by Señor Cánovas del Castillo, Dec. 9, 1879. Early in 1881 the Conservative government of Señor Cánovas del Castillo was overthrown and a coalition between Señor Sagasta and General Martinez Campos came into power. In the new ministry Campos held the presidency of the council and the portfolio of war. He retained the latter position in the Cabinet of Jan. 9, 1883, finally resigning, Jan. 18, 1884. In 1893 he commanded the expedition against Morocco, and was Spanish commissioner in negotiating a treaty of peace and indemnity. He was appointed captain-general of Cuba to succeed General Callejas, March 26, 1895, but failing to suppress the insurrection he was superseded, Jan. 17, 1896, by General Valeriano Weyler (q.v., in these Supplements).

MARTINEZ DE LA ROSA, FRANCISCO. See SPAIN, Vol. XXII, p. 361.

MARTINSBURG, a town and the capital of Berkeley County, easternmost West Virginia, on Tuscarora Creek, in the Shenandoah valley, 80 miles W. of Washington, and on the Cumberland Valley and the Baltimore and Ohio railroads. It contains a national and two other banks, carriage factories, foundries, distilleries, machine and railway repair shops, lime and phosphate works, woolen and hosiery mills, planing-mills and a bicycle factory. The vicinity produces wheat, corn and grass. Population 1890, 7,226.

MARTIN'S FERRY, a city of Belmont County, southeastern Ohio, nearly opposite Wheeling, West Virginia, on the Ohio River, and on the Wheeling and Lake Erie, the Pittsburgh and Cleveland and the Cleveland, Lorain and Wheeling railroads. It contains important glass-works, said to be the largest in the United States, and has manufactures of engines, nails, barrels, stoves and agricultural implements, iron and steel works, pigment works and foundries. Population 1890, 6,250.

MARTINSVILLE, a city and the capital of Morgan County, central Indiana, 31 miles S.W. of Indianapolis, on White River, and on the Pittsburgh, Cincinnati, Chicago and St. Louis and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It has a large grain trade, and contains a foundry, machine-shop, bucket factory, woolen factory, flour-mill and saw-mills. It has some rather famous artesian wells, valuable in rheumatic and kidney complaints, and has five sanatoriums. Population 1890, 2,680.

MARTINSVILLE, a village and the capital of Henry County, central southern Virginia, 65 miles S.S.W. of Lynchburg, on the Danville and Western and the Norfolk and Western railroads. It is in a tobacco-growing region, has a large trade in leaf-tobacco and has tobacco factories. Population 1890, 1,850.

MARTIUS YELLOW OR MANCHESTER YELLOW. See TAR, Vol. XXIII, p. 59.

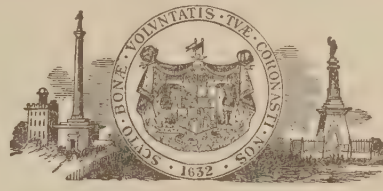
MARTYR, PETER. See VERMIGLI, Vol. XXIV, p. 166.

MARVEL, IK. See MITCHELL, DONALD GRANT, in these Supplements.

MARWAR. Same as JODHPUR, Vol. XIII, p. 703.

MARX, KARL. See SOCIALISM, Vol. XXII, p. 210; and ANARCHISM, in these Supplements.

MARYLAND. According to the eleventh decennial census, Maryland had a population of



STATE SEAL OF MARYLAND.

1,042,390, of whom 515,691 were males and 526,699 were females. In the four cities of the state, 465,479 people resided, constituting 44.65 per cent of the entire population. The density was 105.72 to the square mile, a gain of 10.90 since 1880. The percentage of native-born population was 90.95; that of foreign-born, 9.05. The negroes of the state numbered 215,657,—a gain, for the ten years preceding, of 5,427. The relative rank among the states held by Maryland in 1880 was twenty-third; and although a gain in population of 11.49 per cent was made during the decade, the rank in 1890 was twenty-seventh.

The total number of farms returned by the census reports was 40,789; their average size, 121 acres; the total value of the farms, fences, buildings and farm machinery and implements was \$200,792,960,—a gain, in the ten years, of \$13,635,694. Of the farming-land, 1,239,428 acres were devoted to the production of the cereals, on which was raised 25,764,098 bushels. Of this acreage, 47.34 per cent was devoted to corn; 41.21 to wheat; 8 to oats; .07 to barley; 2.77 to rye; and .61 to buckwheat; 586,817 acres in corn produced 14,928,142 bushels; 510,727 acres in wheat produced 8,348,177 bushels; 99,195 acres in oats produced 2,019,658 bushels; 818 acres in barley produced 18,778 bushels; 34,302 acres in rye produced 352,596 bushels; 7,569 acres in buckwheat produced 96,747 bushels; 20,274 acres cultivated in tobacco yielded 12,356,838 pounds; 24,987 acres in Irish potatoes produced 1,749,655 bushels; and 4,924 acres in sweet potatoes yielded 408,549 bushels; in addition to which, the production of molasses, broom corn and honey was large.

The following table relative to the manufac-

tories of Maryland is condensed from the census returns:

INDUSTRY.	NUM-BER.	CAPITAL.	WORKERS.	PRODUCT.
All industries---	7,485	\$119,667,316	107,054	\$171,842,593
Men's clothing---	125	9,782,643	13,094	15,032,924
Masonry, brick and stone-----	131	3,062,557	4,576	10,282,435
Fruits and vegetables, canned--	197	2,739,008	13,213	7,196,109
Fertilizers-----	53	6,935,914	1,232	6,208,025
Flour'g and grist mill products--	335	3,007,730	932	6,904,888
Cotton goods----	15	7,296,793	4,313	5,457,792
Car and railroad construction --	10	2,904,677	3,014	5,079,035

Other industries of importance were foundry and machine-shop products, malt liquors, iron and steel, lumber, planing-mill products, slaughtering, meat-packing and tobacco.

There were 30,609 persons engaged in the oyster-fishery of the state, the capital invested in the business being \$4,518,758, the product 10,282,752 bushels, of a value of \$4,467,325; the number of vessels employed was 1,380; the number of boats, 6,759. In the menhaden-fishery, Maryland had an output of the value of \$44,360; in the shad and alewife-fishery, \$755,013. Maryland stood second among the states in the value of the products of all classes of fisheries, the total being \$5,564,024.

During the year 1895 there was available in the state treasury the sum of \$3,159,318. The disbursements were \$2,454,750, leaving a balance of \$704,568. The disbursements for the public schools, including the academic fund, amounted to \$699,717 for the fiscal year ending Sept. 30, 1895. The expenses of the state prisons and the charitable institutions of the state for the two years 1894 and 1895 exceeded \$600,000. The total funded debt of Maryland was \$8,684,986, as reported by the state comptroller at the close of 1895. The productive assets of the state and the amount of investments to the credit of the sinking funds aggregated \$5,679,733, leaving a balance as the net debt of the state of \$3,005,253. Overdue credits, and the difference between par and market values of the state assets, would, if available, extinguish the entire debt. The assessable property of the state was of a total value, in 1895, of \$534,930,476—an increase from \$482,184,824 in 1890. The tax rate in 1895 was 17¾ cents on each \$100.

The coal-field of Maryland is situated between Savage and Dan's mountains, in Garrett and Allegany counties. The mountain ranges are filled with veins of varying thickness, though little attention is paid to any except the one known as the "fourteen-foot seam." The report of the inspector of mines for 1895 shows that during the year 3,479,499 tons of coal were mined, the number of men employed being 3,921.

Naturally and climatically, Maryland is divided into the four divisions, eastern, southern, north-central and western. The first, usually called

the Eastern Shore, is divided from the remainder of the state by the Chesapeake Bay, and is made up of nine counties, which, with Delaware and two counties of eastern Virginia, form the peninsula, widely known for its peach-growing industries and numerous other profitable pursuits. One of the nine counties, Worcester, touches the Atlantic Ocean, and seven of them touch the Chesapeake Bay. The proximity of ocean and bay greatly modifies the temperature; the products of the soil are many, oysters and fish abundant and cheap and living inexpensive. The five counties that comprise southern Maryland are the principal tobacco-growing ones. The land is somewhat higher and more broken than the Eastern Shore. There is considerable timberland and some fine river bottoms, which are very productive. Annapolis, the capital, is within this division. Western Maryland is made up of four counties, and includes the coal district. There is a succession of parallel ranges of mountains with deep valleys, the mountains sometimes reaching an altitude of 3,000 feet above the sea-level. There is a vast area of fine timberland in this division and mills are numerous. Iron and steel works are many in Allegany County, and the entire section is thrifty and prosperous. Washington County is claimed to have more miles of turnpike than any other county in the United States; and Frederick is the richest, agriculturally, of all the counties of Maryland. North-central Maryland is made up of five counties, the most prominent of which is Baltimore County. Farming, stock-raising, fruit and vegetable packing, and cotton and flouring mills are among the industries of this section of the state, which is in every way prosperous.

There are 240 building and loan associations doing business in the state, whose total assets are \$12,465,078, the total membership being 63,398, of whom 18,473 are borrowers. At the date of the last report (1896) the aggregate loans on real estate amounted to \$10,133,549.

The State Board of Education reported, for the fiscal years ending Dec. 31, 1894, in the city of Baltimore, and July 31, 1895, in the counties, the following: Number of schools in Baltimore, 179; number in the counties, 2,154; number of pupils, city, 78,275; number of pupils, counties, 126,469; the total number of pupils in daily attendance was increased 5,020 over the preceding fiscal years; the number of teachers, city, 1,626; number in counties, 2,887; total receipts from all sources, \$2,349,341; total expenses, \$2,388,281,—an increase of \$40,269 over the preceding years. Of the denominational institutions of learning in Maryland, Loyola College at Baltimore, Rock Hill College and St. Charles College, both at Ellicott City, and Mount St. Mary's College at Mount St. Mary's, are all controlled by the Catholic Church. The Methodist Episcopal Church has Morgan College at Baltimore; the Presbyterian Church, New Windsor College at New Windsor; and the Methodist Protestant Church controls Western Maryland College at Westminster. St. John's College at

Annapolis is non-sectarian, as is Johns Hopkins University at Baltimore and Washington College at Chestertown.

The charitable, correctional and penal institutions of Maryland are many, and receive liberal appropriations for their maintenance and improvement. Among the principal institutions coming under the head named are the following: Asylum for the Feeble-Minded, Baltimore Orphan Asylum, Baltimore City Hospital, the Deaf and Dumb Asylum, Home of the Friendless, House of Correction, House of Refuge, House of Reformation for Colored Children, Infirmary of Western Maryland, Maryland Hospital for the Insane, Maryland Penitentiary, and St. Mary's Industrial School. In addition to the above-named there are a number of other institutions which receive state support, the appropriations of the legislature aggregating annually in excess of \$500,000 for division among forty institutions. The penitentiary was opened in 1811, and from that date to 1894 had received 13,205 convicts. Its capacity is about seven hundred, which is near the average number incarcerated. The structure is on East Madison Street, in the city of Baltimore, and the site and improvements are valued at \$1,000,000. The House of Correction, in Anne Arundel County, has a farm of two hundred acres connected with the institution, which proves a source of much profit to the state. The school for the blind is on North Avenue, opposite Calvert Street, in Baltimore. About one hundred pupils attend, the cost for maintenance being close to \$30,000 annually. The school for the deaf, located in Frederick City, was incorporated in 1867, and since that time, up to 1896, had more than four hundred pupils under instruction. The school has a capacity for 150 and receives an annual appropriation of \$25,000.

The number of newspapers published in Maryland in 1896 was 195. Papers were published in all of the 23 counties and in all of the county capitals. Of the total number of papers, 16 were daily, 1 semiweekly, 149 weekly, 2 semimonthly, 22 monthly and 5 quarterly.

The following is a list of the governors of Maryland, with their terms of office: John E. Howard, 1789-91; George Plater, 1791-93; Thomas Sim Lee, 1793-95; John S. Stone, 1795-98; John Henry, 1798-99; Benjamin Ogle, 1799-1802; John F. Mercer, 1802-04; Robert Bowie, 1804-06; Robert Wright, 1806-09; Edward Lloyd, 1809-11; Robert Bowie, 1811-13; Levin Winder, 1813-15; Charles Ridgeley, 1815-18; Charles W. Goldsborough, 1818-20; Samuel Sprigg, 1820-23; Samuel Stevens, Jr., 1823-26; Joseph Kent, 1826-29; Daniel Martin, 1829-30; Thomas K. Carroll, 1830-31; Daniel Martin, 1831; George Howard, 1831-33; James Thomas, 1833-36; Thomas W. Veazey, 1836-39; William Grayson, 1839-42; Francis Thomas, 1842-45; Thomas G. Pratt, 1845-48; Philip F. Thomas, 1848-51; Enoch L. Lowe, 1851-56; Thomas W. Ligon, 1856-58; Thomas H. Hicks, 1858-62; Augustus W. Bradford, 1862-65; Thomas Swan,

1865-68; Oden Bowie, 1868-72; W. Pinkney Whyte, 1872-75; James B. Groome, 1875-76; John Lee Carroll, 1876-80; William T. Hamilton, 1880-84; Robert M. McLane, 1884-85; Henry Lloyd, 1885-88; Elihu E. Jackson, 1888-92; Frank Brown, 1892-96; Lloyd Lowndes, 1896. See also MARYLAND, Vol. XV, pp. 602-605.

MARYSVILLE, a city and the capital of Yuba County, northern central California, 40 miles N. of Sacramento, situated at the confluence of the Feather and Yuba rivers, and on the Southern Pacific railroad. It is in an agricultural and mining region, manufactures woolen goods, flour and carriages and has foundries, large canneries, a winery and machine-shop. Population 1890, 3,991.

MARYSVILLE, a city and the capital of Marshall County, northeastern Kansas, 92 miles W. of St. Joseph, Missouri, on the St. Joseph and Grand Island and the Union Pacific railroads, and on the east bank of Big Blue River. By means of a dam across the river the water-power is utilized by several flour and other mills. It has also cigar factories, a foundry and machine-shop, water-works, an electric-light plant, a national bank and good public schools. Population 1890, 1,913; 1895, 2,297.

MARYSVILLE, a city and the capital of Union County, western central Ohio, 28 miles N.W. of Columbus, on the Toledo and Ohio Central and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in an agricultural country, where there are also magnetic and saline springs of medicinal value. Butter-tubs, spokes and other wooden articles are manufactured. Population 1890, 2,810.

MARYVILLE, a city and the capital of Nodaway County, northwestern Missouri, 45 miles N. of St. Joseph, on the One Hundred and Two River, and on the Kansas City, St. Joseph and Council Bluffs and the Omaha and St. Louis railroads. Stock-raising and farming are the chief industries of the surrounding region. Population 1890, 4,037.

MARYVILLE, a manufacturing village and the capital of Blount County, eastern Tennessee, 15 miles S. of Knoxville, on the Knoxville and Augusta railroad. It is the seat of Maryville College, a Presbyterian co-educational institution founded in 1819, which, in 1896, had 15 instructors, 415 students and a library of 12,000 volumes. Freedman's College is also located here. It has manufactories of woolen goods, flour and woodenware. Population 1890, 1,686.

MAS-À-FUERA. See JUAN FERNANDEZ, Vol. XIII, p. 757.

MASCAGNI, PIETRO, an Italian composer; born in Leghorn, Dec. 7, 1863. He was intended for one of the learned professions, but, showing a tendency toward music at an early age, was sent by an uncle to the Milan Conservatory. Here he failed to get along with his teachers, and joined a traveling opera company. He became conductor to many such companies, and led a wandering life till he married in 1886 and settled at

Cerignola as a teacher of music. While here, in competition for a prize for a one-act opera, he composed *Cavalleria Rusticana*, the libretto of which was written by a friend, Menasci. The composition had an immediate success and has been performed in Italian, German, French, English and Russian. His later operas include *L'Amico Fritz* founded on *L'Ami Fritz* of Erckmann-Chatrian; *I Rantzau*, founded on a work by the same authors; and *Ratcliffe*. In July, 1893, he conducted selections from his compositions before Queen Victoria at Windsor.

MASCART, ÉLEUTHÈRE ÉLIE NICOLAS, a French physicist; born in Quarouble, Feb. 20, 1835; educated at the College of Valenciennes and at the École Normal Supérieure. At first he was attached to the École Normal as conservator of the scientific collections, and later became assistant to M. Regnault, whom he succeeded in the chair of physics in 1872. Aside from his collegiate work, he performed many scientific and technical labors for the French government, having had charge of the manufacture of cartridges and chassepots during the Franco-Prussian war, and becoming director of the Weather Bureau in 1878. He took an important part in the Paris exhibitions of 1881 and 1889, and was a member of the electrical congresses held in those years. He was also present at the congress held in Chicago in 1893. The French Academy elected him a member in 1884, and in 1889 he was elected commander of the Legion of Honor. Mascart is especially noted for his works on electricity. Among his writings are *Traité d'Électricité Statique* (1876); *Leçons sur l'Électricité et le Magnétisme* (1882); *Traité d'Optique* (1889-91).

MASCOUTAH, a city of St. Clair County, southwestern Illinois, 43 miles S.W. of St. Louis, on the Louisville and Nashville railroad. It is in a farming district, where coal is plentiful, and contains steam flour-mills. Population 1880, 2,558; 1890, 2,032.

MASENIA OR MASENA, a walled town of Africa, capital of Baghirmi, 100 miles S.E. of Lake Chad. It is fairly well constructed, on very rough ground, has a brick palace for the sultan, and is a place of considerable trade, but is decaying on account of its extreme unhealthfulness.

MASÈRES OR MAZÈRES, FRANCIS, an English mathematician and philanthropist; born in London, Dec. 15, 1731, of a French family, which settled in England on the revocation of the edict of Nantes; was educated at Kingston and Cambridge; called to the bar, and appointed attorney-general of Québec. In 1771 he carried a bill through the House of Commons, enabling rate-payers of parishes to establish savings banks; but the bill was thrown out by the Lords as revolutionary. (See ENGLAND, Vol. VIII, p. 256.) In 1773 he was made cursitor baron of the exchequer and agent to the Protestant settlers of Québec. He urged the adoption of conciliatory measures toward the disaffected colonies in North America, and his deep interest in the laboring classes resulted in the publication of his *Principles*

of the Doctrines of Life Annuities (1783). In addition to this work, and his mathematical writings, the most important of which is *A Dissertation on the Negative Signs in Algebra* (1758), he wrote much of a political and historical nature. He died at Reigate, May 19, 1824.

MASHONALAND. See AFRICA and RHODESIA, in these Supplements.

MASOCH, LEOPOLD VON SACHER. See SACHER-MASOCH, in these Supplements.

MASON, a city and the capital of Ingham County, southern central Michigan, 12 miles S. of Lansing, on the Michigan Central railroad. It is in a grain, fruit, stock-raising and dairying region, and has manufactories of wagons, road-carts, brick and tiles and also several mills. Population 1890, 1,875; 1895, 1,761.

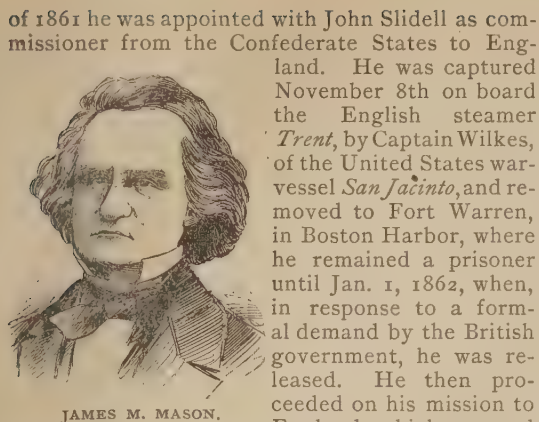
MASON, a village and the capital of Mason County, southern central Texas, 95 miles W.N.W. of Austin. The nearest railroad station is Llano, 30 miles east, on the Austin and Northwestern railroad. It is in a farming and grazing region. Population 1890, 1,137.

MASON, a post village of Mason County, western West Virginia, on the south bank of the Ohio River, opposite Pomeroy, Ohio, and on the Ohio River railroad. It is a coal mining and shipping point, manufactures nails, and obtains salt from artesian wells. Population 1890, 1,029.

MASON, CHARLES. See MASON AND DIXON'S LINE, Vol. XV, p. 611.

MASON, GEORGE, an American statesman; born at Doeg's Neck, Stafford (now Fairfax) County, Virginia, in 1725. After his marriage he settled near Mount Vernon, and became an intimate friend of Washington. In 1776 he drafted the Declaration of Rights and the constitution of Virginia, which were adopted unanimously, and in 1787 was a member of the convention that framed the constitution of the United States. He, however, being dissatisfied with the constitution, opposed its ratification, and, together with Patrick Henry, led the opposition to its adoption in the Virginia assembly. He was twice elected to the Continental Congress, but declined to serve; and was chosen one of the first United States Senators from Virginia, refusing also to act in this capacity. He then retired to his home on the Potomac, where he resided till his death, which occurred Oct. 17, 1792. His statue is one of the group which surrounds the statue of Washington in front of the state capitol at Richmond, Virginia.

MASON, JAMES MURRAY, an American publicist, grandson of the preceding; born in Fairfax County, Virginia, Nov. 3, 1798; educated at the University of Pennsylvania and at William and Mary College, and admitted to the bar in 1820. He served many years in the Virginia House of Delegates, and sat in Congress as a Democrat from 1837 to 1839. From 1847 to 1861 he sat in the United States Senate from Virginia. For a long time he was chairman of the Senate committee on foreign relations. He was an earnest advocate of slavery, author of the fugitive slave law, and a leader in the secession movement. In the autumn



JAMES M. MASON.

of 1861 he was appointed with John Slidell as commissioner from the Confederate States to England. He was captured November 8th on board the English steamer *Trent*, by Captain Wilkes, of the United States war-vessel *San Jacinto*, and removed to Fort Warren, in Boston Harbor, where he remained a prisoner until Jan. 1, 1862, when, in response to a formal demand by the British government, he was released. He then proceeded on his mission to England, which proved

fruitless. Returning to the United States at the close of the war, he died, near Alexandria, Virginia, April 28, 1871.

MASON, JEREMIAH, an American public man, born in Lebanon, Connecticut, April 27, 1768. After graduating at Yale he studied law, and in 1791 was admitted to the New Hampshire bar. He began the practice of law at Westmoreland, and in 1797 removed to Portsmouth. In 1802 he became attorney-general of the state. In 1807 Daniel Webster went to Portsmouth, and he and Mr. Mason were on opposite sides on most of the important cases in New Hampshire. From 1813 to 1817 he was a United States Senator, and then for several sessions was a member of the legislature. From 1829 to 1832 he was president of the Portsmouth (New Hampshire) branch of the United States Bank. He then settled in Boston, and continued his practice of law until 70 years of age. He died in Boston, Oct. 14, 1848.

MASON, JOHN, (d. 1635), a governor of New-foundland and vice-admiral of New England. See NEW HAMPSHIRE, Vol. XVII, p. 393.

MASON, JOHN, an American soldier; born in England about 1600; served under Sir Thomas Fairfax in the Netherlands. Removing to America, he was one of the first settlers of Dorchester, Massachusetts, and in 1635 aided in founding the town of Windsor, Connecticut. In 1637 he commanded a successful expedition against the Pequod Indians, in which with a handful of whites he annihilated a powerful tribe, and secured a general peace with the Indians which remained unbroken for forty years. Mason then settled in Saybrook, and later in Norwich, and was major of the colonial forces more than thirty years. From 1642 to 1668 he was a magistrate, and from 1660 to 1670 the deputy-governor of Connecticut. At the request of the General Court he published an account of the Pequod War. He died at Norwich, Connecticut, in 1672.

MASON, JOHN YOUNG, an American statesman; born in Greensville County, Virginia, April 18, 1799; graduated at the University of North Carolina, and studied law at Litchfield, Connecticut. In 1819 he began the practice of law in Southampton County, Virginia, and was a member

of the legislature and of the state constitutional convention in 1829. From 1831 to 1837 he was a member of Congress, and later was judge of the United States district court and of the circuit court of Virginia. In 1844 he became Secretary of the Navy, and in 1845 was appointed United States Attorney-General; but the following year was placed again at the head of the navy department. In 1849 he removed to Richmond and resumed the practice of law. He was president of the Virginia constitutional convention of 1850. From 1853 till his death, which occurred in Paris, October 3, 1859, he was United States minister to France.

MASON, SIR JOSIAH, an English philanthropist; born in Kidderminster, Feb. 23, 1795. He began life by selling cakes on the street, and after turning his hand to various employments took the split-ring business of Mr. Harrison at Birmingham. He began to make pens for Perry & Co., and his business increased till he became the largest penmaker in the world. Partner with Elkinton in his electro-plating trade, he gave Dr. C. W. Siemens his first start in life by paying him \$8,000 for a patent; and paid Krupp, founder of the works at Essen, \$50,000 for the patent for machinery to roll the metal "blanks" from which spoons and forks are made. Mason erected and endowed almshouses, and an orphanage at Erdington, at a cost of \$1,300,000, and was the founder of the Josiah Mason College at Birmingham. For these great benefactions he was knighted in 1872. He died at Erdington, June 16, 1881.

MASON, LOWELL, an American musician; born in Medfield, Massachusetts, Jan. 8, 1792. At the age of 16 he was so proficient in vocal music that he was leader of a Massachusetts village choir and a teacher of singing-classes. In 1812 he went to Savannah, Georgia, and there continued to practice, lead and teach. In the course of these labors he formed, with the help of F. L. Abel, a collection of psalm-tunes, published by the Handel



LOWELL MASON.

and Haydn Society of Boston in 1822, under the title of the *Handel and Haydn Society's Collection of Church Music*, Mason's name being almost entirely suppressed. In 1827 he removed to Boston, where he labored zealously to raise the standard of church music. He formed musical classes, held institutes and delivered lectures in many New England towns and cities, and was prominent in the founding of the Academy of Music in Boston. In 1837 he visited Europe to study on the Continent and in Great Britain the latest methods of musical instruction, and whatever he approved he adopted and used. The last years of his life were passed with his sons at Orange, New Jersey, where he died Aug. 11,

1872, his devotion to musical study and composition continuing to the end. Doctor Mason was a voluminous author, and alone, or in connection with George James Webb, published more than forty collections of church and Sunday-school music, glee-books, etc. He probably did more than any other American to make music popular in the church, school and home. Doctor Mason's library, considered the finest collection of musical works in the United States, was bequeathed to Yale college. In 1855 he received from the University of the City of New York the degree of Mus.Doc., the first degree of the kind ever conferred in America.

MASON, OTIS TUFTON, an American anthropologist; born in Eastport, Maine, April 10, 1838. His childhood was spent in Virginia, and his education received at Columbian University, where he afterward taught for a number of years. He became curator of the department of ethnology in the United States National Museum in 1884. He was a member of various scientific societies, and his writings have appeared in *The American Naturalist* and in *The Annual Record of Science and Industry*. He wrote extensive treatises on the primitive industries of the early races of America, which were published by the Smithsonian Institution.

MASON CITY, a town of Mason County, central Illinois, 27 miles N. of Springfield, on the Chicago and Alton and the Illinois Central railroads. It is situated in the best corn-growing region of the state; horses, mules and cattle are raised. It has flour-mills, brick-yards and grain-elevators. Population 1890, 1,869.

MASON CITY, a city, and the capital of Cerro Gordo County, central northern Iowa, 142 miles W.N.W. of Dubuque, on the Chicago, Milwaukee and St. Paul, the Iowa Central and the Mason City and Fort Dodge railroads. It has flour-mills, limestone quarries, brick and tile works, machine-shops, a cold-storage house and good water-power, and is situated in an agricultural and stock-raising region. Population 1890, 4,007; 1895, 5,627.

MASON-WORK. See BUILDING, Vol. IV, pp. 468-476; BRIDGES, Vol. IV, pp. 324-326; ROME, Vol. XX, pp. 808-815; WATER-SUPPLY, Vol. XXIV, pp. 406-408.

MASPERO, GASTON CAMILLE CHARLES, a French Egyptologist; born in Paris, of Italian parents, June 24, 1846, and after a course of study at the Lycée Louis-le-Grand, entered the École Normale in 1865. He began to lecture on Egyptology at the school of higher studies in Paris, in 1869, and in 1874 was appointed professor of Egyptology at the College of France. In 1881 he founded a school of Egyptian archaeology at Cairo, and succeeded Mariette Bey as director of explorations and custodian of the Boulak Museum. In 1886 he became professor at the Institute of Paris. As an explorer he has excavated or opened the pyramids of the kings belonging to the fifth and sixth dynasties and the burial-fields of Sakkara and Dashûr, and discovered new sepulchral sites of great value at

Deir el-Bahari, near the entrance to the valley of the Tombs of the Kings, at Ekhnim, 130 miles south of Thebes, and at other places. He is the author of *Essai sur l'Inscription Dédicatoire au Temple d'Abydos* (1869); *Histoire Ancienne des Peuples de l'Orient* (1875); *Études de Mythologie et Archéologie Égyptienne*, etc. A translation, by Amelia B. Edwards, of his *Manual of Egyptian Archaeology*, appeared in 1895.

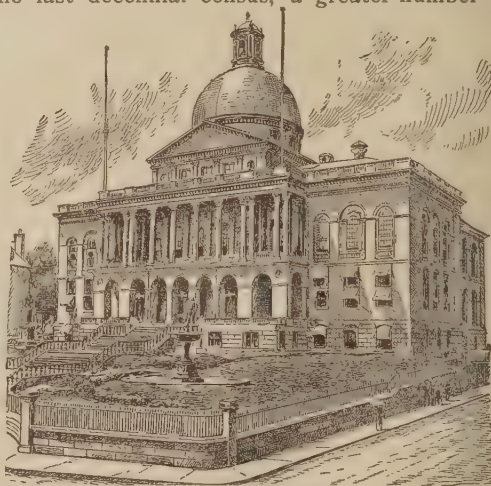


STATE SEAL OF MASSACHUSETTS.

MASS. See MISSAL, Vol. XVI, pp. 508, 511.

MASSACHUSETTS. See Vol. XV, pp. 611-616, for article of recent date.

The census of 1890 gave the population of the state at 2,238,943, of whom 1,087,709 were males and 1,151,234 were females. A census taken in 1895, under state authority, showed a material increase, the males numbering 1,214,701 and the females 1,285,482; a total of 2,500,183, or a gain of 28.73 per cent for the ten years preceding. Massachusetts had, at the time of the taking of the last decennial census, a greater number of



STATE CAPITOL, BOSTON.

females to each 100,000 males than any of the states of the Union, and a greater percentage of urban population than any of the states, with the single exception of Rhode Island. Of the inhabitants, 1,564,931 resided in the 47 cities, constituting 69.90 per cent of the total population. The percentage of native-born citizens was 70.65; of foreign-born, 29.35. The negroes numbered 22,144, a decrease of 3,447 since 1880. The density of population was 278.48 to the square mile, an increase of 46.70 for the ten years preceding, 36.92 coming within the last five years of the decade. Massachusetts led the states, with Rhode Island excepted, in the density of popu-

lation, and has retained the same relative position since 1800.

Massachusetts is pre-eminently a manufacturing state, and, as is shown by the annual reports of the state bureau of statistics of labor, the industry is increasing constantly. The decennial census returns, which gave the business of 1889, are the last complete statistics on the subject, although the state reports show that the capital invested has increased for every year since up to 1896, and that the number of workers and the value of the products have increased also. The returns for 1889 were as follows:

BUSINESS.	NUM- BER.	CAPITAL.	WORK- ERS.	PRODUCT.
All industries----	26,923	\$630,032,341	458,182	\$888,160,403
Boots and shoes, factory products	1,057	44,567,702	69,934	116,387,900
Cotton goods----	187	128,838,837	76,213	100,202,882
Foundry and ma- chine-sh'p prod.	711	36,621,187	25,027	38,906,680
Woolen goods----	165	34,911,187	19,813	35,771,161
Leather, tanned and curried----	138	9,002,929	5,852	21,656,425
Paper -----	85	22,467,036	8,111	21,524,173

The number of farms in Massachusetts in 1889 was 34,374, a decrease of nearly 4,000 since 1879, and only 305 more than in 1849. Notwithstanding the decrease in the number of farms, the percentage of improved land has increased constantly, and the methods of farming have become more scientific. Much attention is given to advanced agriculture throughout the state, members of the board having been chosen from 35 different localities, who, together with the members appointed by the governor and council and 6 *ex officio* members, including the governor, make up the State Board of Agriculture. Among the leading crops raised in 1895 were hay, corn, tobacco, oats and buckwheat. Owing to the great percentage of urban population, the farmers of Massachusetts find great profit in the culture of the market-garden crops, in dairy products and small fruits.

There has been a constant growth in the assessed value of all property within the state for the purpose of taxation. The returns of the date of May 1, 1895, show a total of \$2,542,348,993. The greatest gain in assessed valuation was in real estate, the increase since 1890 being almost three hundred million dollars, while the advance in the value of personal property was but \$23,000,000. The total taxes assessed on the valuation of 1895 were \$38,084,609, of which 75 per cent was on real estate, the remainder being on polls and personal estate. The number of horses was 195,483; cows, 175,016; sheep, 39,843; neat cattle other than cows, 36,817; and swine, 37,994. The number of dwelling-houses was given at 404,388, an increase of 10,201 within the year preceding, and 53,851 since 1890. The report of the state auditor for 1895 shows the total debts and liabilities of Massachusetts to be \$29,677,935; the total resources, which included sinking funds, bonds, cash and lands, amounting to \$20,690,474. Inter-

est was paid on the indebtedness for 1895 to the amount of \$1,158,559. The total expenses for the year were \$18,468,407, of which \$7,045,827 was the actual operating expenses of the state government, an amount \$58,625 in excess of the sum required for that purpose in 1894.

Massachusetts led all the states in the value of general fisheries, as shown by the decennial census of 1890, the amount of all products being \$6,367,033. Almost the entire cod-fishery interests of the United States are centered in Massachusetts, the industry giving employment to more than seven tenths of the total number employed, having capital invested to the extent of more than four fifths of the entire value of apparatus and other property, and returning \$3,498,812 of the \$4,262,334 which represented the value of the entire business. In lobster fishery Massachusetts stands second to Maine only, and produces about one fifth of the catch of the eight states engaged in the work. Massachusetts does about five sixths of the entire mackerel fishery of the United States, Connecticut, Maine and Rhode Island contributing the remainder. Other branches of this important industry are menhaden, sea-hering, shad and alewife fishery. Whale fishery was reported from California, Connecticut, New York, Washington and Massachusetts in the census of 1890, the reports showing that Massachusetts had more than one half of the total number of persons employed in the business, more than one half of the capital invested, and produced more than one half of the value of the products. For the year named the general value of all fisheries reached the sum of \$5,234,968.

Massachusetts is famed for its product of granite, the annual value of the stone mined exceeding one fifth of the output of the quarries of the United States. Limestone and sandstone also found, and a limited amount of coal is mined.

The report of the railroad commissioner for the year 1895 gives the total mileage of main and branch lines as 2,114.384. The second, third and fourth track and side track make the total length of railroad track within the state 4,228.160 miles, an increase over 1894 of 17.965 miles. Fifty corporations owned and operated the railroads of the state, which reported gross incomes from operation \$68,154,906, an increase over the preceding year of \$4,026,483. The gross operating expenses were \$46,446,304, to which other expenses and charges were added to produce a total expenditure of \$74,626,252. This, deducted from the total income from all sources, left a deficit of \$38,546, that of the preceding year having been \$1,823,561.

The opening of 1896 found the National Guard of the state numbering 422 officers and 5,247 enlisted men. The total expenses of the military of the state for 1895 were \$262,100.

In 1894 408,898 children of school age, 5 to 15 years, were enumerated, an increase of 8,573 over the enumeration of 1893. The number enrolled in the schools of the state was 412,593, an

increase over the preceding year of 11,984. In 1895 the number in attendance upon the schools was 367,047, an increase of 7,285 over 1894. The average duration per year of the schools of the state was 9 months and 6 days. The total expended for the maintenance of the schools was \$10,661,356, an average of \$26.07 for each child of school age in the state. The total number of teachers employed in 1895 was 12,027. In addition to the ordinary schools, 54 towns maintained evening schools to the number of 747, at which 29,268 pupils gave an average attendance of 15,371. These schools were kept up by an expenditure of \$176,188. Two hundred and thirty towns had 252 high-schools, in which 32,752 pupils were enrolled, an increase of 2,212 over 1894, and making the ratio of the high-school enrollment about 8 per cent of the general enrollment. There were 341 private schools, at which 59,204 pupils were in attendance, and 59 incorporated academies, with 5,484 pupils. Normal schools were maintained at the following places: Bridgewater, 256 students, 80 graduates; Framingham, 138 students, 43 graduates; Salem, 221 students, 56 graduates; Westfield, 124 students, 40 graduates; Worcester, 215 students, 42 graduates; Normal Art School, Boston, 268 students, 28 graduates. Many manual-training schools are maintained in different cities of the state, the majority of which have been established since 1890. The institutions of higher education are numerous and of a high order. They include: Harvard College, Williams College, Amherst College, Mt. Holyoke College, the College of the Holy Cross, at Worcester, Tufts College, Massachusetts Institute of Technology, Boston College, Massachusetts Agricultural College, Worcester Polytechnic Institute, Boston University, Wellesley College, Smith College, at Northampton, and Clark University. The majority of these will be found separately and fully described under their appropriate titles in these Supplements.

In 1895 there were confined in the state prison, at Boston, 683 prisoners as an average, whose services yielded the state a net profit of \$28,903. The cost of their support was \$138,475, making the actual cost to the state for the year \$109,571. Sept. 30, 1895, there were \$5,007 prisoners in the different jails of the state, 1,011 in the State Reformatory, 1,677 in the House of Industry, and 574 at the State Farm.

Below is given a list of the hospitals for the insane, with the number of patients, Sept. 30, 1895, and the cost of maintenance for the year:

Worcester Hospital -----	961	\$196,734
Worcester Asylum -----	447	76,026
Taunton Hospital -----	846	144,780
Northampton Hospital -----	546	116,611
Danvers Hospital -----	948	175,454
Westborough Hospital -----	567	109,609

Total for the six institutions..... 4,315 \$819,217

Other asylums, municipal and private, maintain patients at the expense of the state, the number at the date of the above report being 1,448. Eight hundred and three patients were confined in town

almshouses, and 202 boarded in private families, making the total number of insane kept at the expense of the state, 6,768. In addition to the institutions named above, there was appropriated in 1892 the sum of \$1,000,000 for the construction of an asylum at Medfield, which was occupied first in the summer of 1896. In 1895 the legislature authorized the construction of a separate asylum for epileptics, to be located at Monson. There is sustained by the state an asylum for dipsomaniacs and inebriates, at Foxborough, at which 129 patients were under treatment at the date of the above report, the cost to maintain them for the year amounting to \$45,774. The School for the Feeble-minded, at Waltham, had 423 inmates, the annual expenses being \$70,012. The hospital cottage for children, at Baldwinville, reported 105 children and the expenses for the year \$27,797. The State Farm had paupers, prisoners and insane to the number of 953, whose maintenance cost \$98,502. The State Almshouse, with 1,064 inmates, required the sum of \$208,612 for the expenses of the year. The State Industrial School for Girls, with 111 inmates, expended during the year \$48,222. The Lyman School for Boys, with 264 inmates, required \$58,965 for the expenses of the year.

Other charitable institutions are the Eye and Ear Infirmary, General Hospital and Homœopathic Hospital, all in Boston; the Hospital for Consumptives; the School for the Blind; the Soldiers' Home, in Chelsea; the Reformatory, in Concord; the Reformatory Prison for Women, in Sherborn; and many county and municipal institutions, maintained either wholly or in part at public expense.

Fifty-two fire-insurance companies, whose home offices were in Massachusetts, reported assets in 1896 of \$9,869,622; eight manufacturers' mutual companies had assets of \$14,708,907; two mutual marine companies had \$527,269; and seven joint-stock companies had \$9,199,631. The insurance companies of other states doing business in Massachusetts reported assets to the amount of \$175,967,934. The life-insurance companies of the state numbered five, with gross assets amounting to \$68,056,187. The companies of other states doing business in Massachusetts reported assets of \$1,038,554,212. Nine assessment life-insurance companies of the state reported expenditures for the year of \$2,579,411; the companies from without the state, \$9,858,725.

In January, 1896, there were 119 co-operative savings banks in Massachusetts, with assets of \$20,552,667; 187 savings banks, with assets of \$466,426,772; 32 trust companies, with assets of \$119,043,157; and 268 national banks had an aggregate capital of \$99,000,000.

Five hundred and eight public libraries, having more than one thousand volumes each, reported above five million volumes. In 308 towns of the state, libraries are free to the public. The college libraries of Massachusetts are among the finest in the United States. (See BOSTON PUBLIC LIBRARY, in these Supplements.)

The church statistics of Massachusetts are as

follows: All bodies, 2,547; edifices, 2,458; seating capacity, 1,102,772; value of church property, \$46,835,014; members, 942,751. The membership of the leading denominations is as follows: All Baptist bodies, 340; Roman Catholic, 381; Congregationalists, 559; all Methodist bodies, 422; Protestant Episcopal, 168; Unitarians, 189; Spiritualists, 61.

Newspapers are published in 231 towns of Massachusetts and in all of the 19 county seats. Jan. 1, 1896, there were 727 papers published, of which 80 were daily, 11 semiweekly, 476 weekly, 6 fortnightly, 9 semimonthly, 120 monthly, 1 every six weeks, 1 bimonthly, and 23 quarterly.

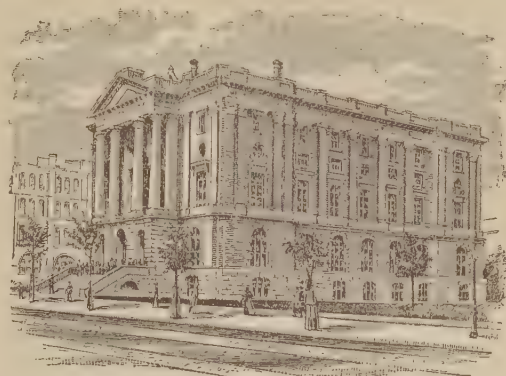
The following Massachusetts cities showed a population in excess of 30,000 by the census of 1895. The population in 1885 is also given for comparison:

City.	1895.	1885.	INCREASE.
Boston -----	496,920	390,393	106,527
Brockton -----	33,165	20,783	12,382
Cambridge -----	81,643	59,658	21,985
Chelsea -----	31,264	25,709	5,555
Fall River -----	89,203	56,870	32,333
Haverhill -----	30,200	21,795	8,414
Holyoke -----	40,322	27,895	12,427
Lawrence -----	52,164	38,862	13,302
Lowell -----	84,367	64,107	20,260
Lynn -----	62,354	45,867	16,487
New Bedford -----	55,251	33,393	21,858
Salem -----	34,473	28,090	6,383
Somerville -----	52,200	29,971	22,229
Springfield -----	51,522	37,575	13,947
Worcester -----	98,767	68,389	30,378

The following is a list of the governors of Massachusetts since the adoption of the constitution in 1780, with their respective terms of office: John Hancock, 1780-85; James Bowdoin, 1785-87; John Hancock, 1787-93; Samuel Adams, 1793-97; Increase Sumner, 1797-99; Moses Gill, 1799-1800; Caleb Strong, 1800-07; James Sullivan, 1807-08; Levi Lincoln, 1808-09; Christopher Gore, 1809-10; Elbridge Gerry, 1810-12; Caleb Strong, 1812-16; John Brooks, 1816-23; William Eustis, 1823-25; Marcus Morton, 1825; Levi Lincoln, 1825-34; John Davis, 1834-35; Samuel T. Armstrong, 1835-36; Edward Everett, 1836-40; Marcus Morton, 1840-41; John Davis, 1841-43; Marcus Morton, 1843-44; George N. Briggs, 1844-51; George S. Boutwell, 1851-53; John H. Clifford, 1853-54; Emory Washburn, 1854-55; Henry J. Gardner, 1855-58; Nathaniel P. Banks, 1858-61; John A. Andrew, 1861-66; Alexander H. Bullock, 1866-69; William Claflin, 1869-72; William B. Washburn, 1872-74; Thomas Talbot, 1874-75; William Gaston, 1875-76; Alexander H. Rice, 1876-79; Thomas Talbot, 1879-80; John D. Long, 1880-83; Benjamin F. Butler, 1883-84; George D. Robinson, 1884-87; Oliver Ames, 1887-90; John Q. A. Brackett, 1890-91; William E. Russell, 1891-94; Frederick T. Greenhalge, 1894-97; Roger Wolcott, 1897-.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a co-educational institution, located in Boston, Massachusetts, for giving instruction

in manual training and in the higher branches of mechanics and kindred sciences. It was organized in 1861, advantage being taken of the Con-



MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

gressional grant to technical colleges. In 1895 there were 1,200 students in attendance, with 143 instructors, and a library of about thirty-nine thousand volumes. Its productive funds in 1895 amounted to \$600,000, and its total income was \$410,000.

MASSAGETÆ. See HERAT, Vol. XI, p. 714; and CYRUS, Vol. VI, p. 753.

MASSASAUGA, the Indian name of a small black rattlesnake of the genus *Crotalophorus* or *Caudis-ona*. It resembles the true rattlesnake *Crotalus*, but differs in that the rattles are poorly developed and the head is covered with plates. It is very poisonous, and is feared even more than the true rattlesnake. The reptile inhabits the central portions of the United States, and is very common in the burrows of prairie-dogs and other animals.

MASSASOIT, an Indian chief, head of the Pokanokets or Wampanoags; born in Massachusetts about 1580. His control extended from Cape Cod to Narragansett Bay. In March, 1621, an Indian, whom the whites called Samoset, appeared three months after the founding of Plymouth, and called, in broken English taught him by some fishermen, "Welcome, Englishmen." He said he came from the great sachem, Massasoit. After some parleying, the chief appeared in person, was received with deference, and a treaty of amity was concluded with his tribe and their confederates and honorably kept for fifty-four years—beyond the lifetime of Massasoit. His residence was in what is now Warren, Rhode Island, near a remarkable spring, which still bears his name, and here he was visited frequently by commissioners from the neighboring settlements. When Roger Williams was banished from Massachusetts and went on his way to Providence, he was entertained by Massasoit for several weeks. Massasoit lived and died a sincere friend to the white settlers. His sons were Alexander and King Philip. He died in 1660.

MASSÉ, FELIX MARIE VICTOR, a French mu-

sical composer; born March 7, 1822, at Lorient. He was educated at the Paris Conservatory, where he took the Grand Prix de Rome for composition. His first opera, *La Chanteuse Voilée*, appeared in 1850, and succeeding this came a large number of productions, which were received favorably. In 1860 he became chorus-master at the Academy of Music; in 1866 succeeded Laborne as professor of composition at the Conservatory; was elected to the Institute in 1872, and made an officer of the Legion of Honor in 1877. Among his compositions, besides the one already mentioned, the best known are *Galatea*, *Paul and Virginia* and *The Seasons*. He died July 5, 1884.

MASSENET, JULES ÉMILE FRÉDÉRIC, a French composer; born in Montaud, May 12, 1842. He studied at the Paris Conservatoire, obtained the first prize for piano-forte in 1859, the first for fugue and the Prix de Rome for his cantata, *David Rizzio*, in 1863. He traveled through Italy and Germany, and made his *début* at the Opera Comique, Paris, in 1868, with *La Grand-Tante*. In 1878 he was appointed professor of composition at the Conservatoire and elected a member of the Académie des Beaux-Arts. He is the author of *Esclarmonde*, a romantic opera, which had a run of one hundred representations without interruption (1889); and several other noted works, including *Don César de Bazan* (1872); *Eve*, a cantata (1875); *Hérodiade* (1881); *Le Cid* (1885); and his orchestra suite, *Scènes Pittoresques*. He wrote also some entr'actes and stage music for Sardou's dramas, *Theodora* and *The Crocodile*.

MASSEY, GERALD, an English poet; born of very poor parents at Tring, Hertfordshire, May 29, 1828, and received a scanty education at the British and National schools. At eight years of age he was working twelve hours a day in a silk manufactory. At the age of fifteen he went to London and found work as an errand-boy, and at twenty-one he became editor of the *Spirit of Freedom*. The following year he was one of the secretaries of the "Christian Socialists," and a personal friend of Charles Kingsley and F. D. Maurice. In 1854 he published *The Ballad of Babe Christabel and Other Poems*, which entered its fifth edition at the end of the year. He then joined the staff of the *Athenæum*, and for ten years wrote a considerable number of its reviews. For several years he wrote on literary subjects, in the *Quarterly Review*. As early as 1852 Mr. Massey began to take a great interest in mesmerism, spiritualism and kindred subjects, and delivered many lectures on such matters, both in London and abroad. He lectured all through North America, Australia and the colonies, twice making the trip from New York to San Francisco. He published several volumes of poems and some prose works, among the former, besides those already mentioned, being *Robert Burns and Other Lyrics* (1859); *Havelock's March and Other Poems* (1861); *A Tale of Eternity and Other Poems* (1870); *My Lyrical Life* (1889); and among the latter, *Concerning Spiritualism* (1872); *The Secret Drama of Shakespeare's Sonnets* (1864-88). He

also made numerous contributions to English and American periodical literature.

MASSICOT. See MINERALOGY, Vol. XVI, p. 385.

MASSILLON, a city of northeastern Ohio. It is the center of the richest wheat-belt in Ohio, and its coal-mining interests have a cash capital of \$1,000,000 and employ several thousand men. Lately established are large stationary engine works, iron-bridge works and threshing-machine works. It is supplied with water, sewer system, electric lights, street-railways and gas. Population 1890, 10,092. See MASSILLON, Vol. XV, p. 617.

MASSON, DAVID, a British author and educator; born Dec. 2, 1822, in Aberdeen, and educated at Marischal College in that city, and at the University of Edinburgh. He began his literary career at the age of nineteen, as editor of a Scotch provincial newspaper. In 1844 he went to London, where he remained about a year; contributed to *Fraser's Magazine* and other periodicals. He established himself in Edinburgh for two or three years, as a writer for periodical publications, besides having special engagements with the Messrs. Chambers, but returned to London in 1847, where he resided for eighteen years, and was appointed to the chair of English language and literature at University College, London, on the resignation of Professor Clough in 1852. He retired from his post in October, 1865, having been appointed professor of rhetoric and English literature in the University of Edinburgh. He contributed numerous articles to the *Quarterly*, *National*, *British Quarterly* and *North British Reviews*, and in 1859 became editor of *Macmillan's Magazine*, which he conducted for a number of years, and to which he contributed largely. He was Rhind lecturer in 1885, and after 1879 he edited the *Register* of the Privy Council of Scotland, contributing the introductions to it. Mr. Masson wrote very important works in literary and philosophical criticism, and several literary biographies. His great work is his ponderous *Life of John Milton, Narrated in Connection with the Political, Ecclesiastical and Literary History of His Time* (6 vols., 1859-80), the most complete biography of any Englishman, and of great value for contemporary history. His other publications include *Essays, Biographical and Critical* (1856); *British Novelists* (1859); *Wordsworth, Shelley, Keats, etc.* (1874); *The Three Devils* (1874); *Chatterton* (1874); and in the same year an elaborate edition of Milton, known as the "Cambridge Edition." He contributed the article on *Milton* to this ENCYCLOPEDIA.

MASSOWAH, a town. In 1865 it passed from Turkey into the hands of Egypt; in 1885 Italy, with the help of England, taking advantage of the Mahdist troubles of Egypt, seized the town, and has made it her chief port and settlement in her protectorate of Eritrea. The climate is unhealthy, dysentery and fever being prevalent. Population 20,000, mostly Arabs; 600 Europeans. See MASSOWAH, Vol. XV, p. 619.

MAST. See SAIL, Vol. XXI, p. 153; and SEAMANSHIP, Vol. XXI, pp. 593, 594.

MASTABA. See PYRAMID, Vol. XX, p. 122.

MASTACEMBELIDÆ. See ICHTHYOLOGY, Vol. XII, p. 690.

MASTER, a title of authority applied to various functionaries. These include: MASTER OF A SHIP. In the American and English navies the rank of master was given to the navigator or sailing-master of a vessel. An act of Congress of 1883 changed the title in the American navy to that of lieutenant (junior grade). In the British navy this officer is now termed a navigating lieutenant, or, on line-of-battle ships and flagships, a staff commander. (See *Navigating Officer*, under NAVY, Vol. XVII, p. 293.) In the merchant service of both countries the captain of a vessel is more technically and correctly termed the master.—MASTERS AT COMMON LAW, and masters in chancery and masters of the crown office are officers of the English system of judicature, whose principal duties are the supervision of interlocutory motions and minor matters in actions and suits, the entry and recording of judgments, and the taxation of bills of costs. See JUDICATURE, Vol. XIII, pp. 764, 765, and CHANCERY, Vol. V, pp. 359-390.—MASTERS IN CHANCERY in the state courts of America are practically official referees, as to whose duties see REFEREE, Vol. XX, p. 319. As to the powers and duties of a MASTER ON LUNACY, see INSANITY, Vol. XIII, p. 113. A high judicial officer in England bears the title of Master of the Rolls. His functions are fully described under ROLLS, MASTER OF, Vol. XX, p. 628.—In the royal household are to be found the Master of the Ceremonies (see ROYAL HOUSEHOLD, Vol. XXI, p. 37, note) and the Master of the Horse, whose duties are described in the same article, Vol. XXI, pp. 37, 38. The Master of the Faculties is an official of the archbishop of Canterbury. See ARCHBISHOP, Vol. II, p. 399. The principal use of the word, however, is twofold—first, to describe the relationship of master and servant; as to which, see MASTER AND SERVANT, Vol. XV, pp. 620, 621; and LABOR AND LABOR LAWS, Vol. XIV, pp. 165-175; and, second, to describe one of the degrees conferred by a university; see UNIVERSITIES, Vol. XXIII, pp. 837-858.

MASTER AND SERVANT. See MASTER AND SERVANT, Vol. XV, pp. 620, 621; and EMPLOYER'S LIABILITY, and MASTER, in these Supplements.

MASTERS, MAXWELL TYLDEN, an English botanist; born in 1833, at Canterbury; was educated at King's College, London, after which he practiced medicine for some years. He held the lectureship on botany at St. George's Hospital from 1865 to 1868, and became principal editor of the *Gardeners' Chronicle* in 1865. Dr. Masters was botanical examiner in the University of London; a fellow of the Royal Linnean and Royal Horticultural societies; an associate of King's College and an honorary or corresponding member of the principal horticultural societies

of Europe and America. His works include *Vegetable Teratology*, which has been translated into German; *Botany for Beginners* and *Plant Life*, both of which have been translated into French, Dutch and Russian, besides numerous monographs and contributions to scientific journals.

MASTERSINGERS or MEISTERSÄNGER, See GERMANY, Vol. X, p. 526; and MUSIC, Vol. XVII, pp. 83-84.

MASTICATION. See NUTRITION, Vol. XVII, pp. 669, 670.

MASTIFF. See DOG, Vol. VII, p. 330.

MAT or MAIT. See EGYPT, Vol. VII, p. 718.

MATABELES. See RHODESIA, in these Supplements.

MATAGALPA. See NICARAGUA, Vol. XVII, p. 477.

MATAMATA, a turtle. See TORTOISE, Vol. XXIII, p. 459.

MATAMOROS, MARIANO, a Mexican patriot and revolutionary leader, one of three priests, the other two being Hidalgo and Morelos, who conducted the earliest insurrection of Mexico against Spanish rule. After the defeat and execution of Hidalgo, Morelos took up the struggle in 1811, and was joined by Matamoros, at that time a priest at Jantelolco. He was made a colonel, and at once showed great military genius, distinguishing himself especially in the heroic defense of Cuautla and the masterly escape from the same place in 1812. In an expedition to Oaxaca he was conspicuous, and in October, 1813, he won the victory of San Augustin del Palmar, which seemed to assure the success of the revolution; but Morelos, against the advice of Matamoros, engaged in movements which resulted in the repulse at Valladolid, and later the defeat at Puruaran, Jan. 5, 1814, where Matamoros was taken prisoner. The offer by Morelos of two hundred prisoners in exchange for him was refused, and he was shot at Valladolid, Feb. 3, 1815; Morelos executed two hundred prisoners in reprisal. Alaman, in his *History of Mexico*, describes Matamoros as the most able military leader of the first revolution. The city of Matamoros, on the Rio Grande, is named in his honor. In the cathedral of the City of Mexico rest together the remains of the three soldier-priests who gave their lives for the foundation of Mexican liberty.

MATERIAL BASIS OF HEREDITY, THE. See HEREDITY, in these Supplements.

MATERIALISM. See STOICS, Vol. XXII, pp. 563, et seq. Reconciliation of Ideality and, see LOTZE, Vol. XV, p. 14; Rise of Sense of, see PSYCHOLOGY, Vol. XX, p. 55-57.

MATERIA MEDICA. See PHARMACOPŒIA, Vol. XVIII, pp. 730, 731.

MATHER, INCREASE (1639-1723). See MATHER, COTTON, Vol. XV, p. 631.

MATHER, RICHARD HENRY, an American educator; born in Binghamton, New York, Feb. 12, 1835; graduated at Amherst in 1857, and in 1859 was appointed tutor of Greek at his alma mater, assistant professor in 1861, professor of Greek and German in 1864, and professor of Greek and lecturer on sculpture in 1878. He secured for Am-

herst a collection of plaster-casts, said to be the finest in the United States, with the exception of the one in Boston. He received the degree of D.D. in 1879, and was the well-known author of several Greek text-books. He was also well known as an orator, and as a preacher in the churches of New York and Boston, where he often appeared, although never regularly settled in any pulpit. He died in Amherst, April 16, 1890.

MATHERS, HELEN BUCKINGHAM. See REEVES, MRS. HENRY, in these Supplements.

MATHESON, GEORGE, a Scotch clergyman and author; born in Glasgow, March 27, 1842; educated at Glasgow Academy and at the University of Glasgow. He lost his sight in youth, but, in spite of this, entered the university in preparation for the ministry, and graduated with a remarkable record, having repeatedly taken the highest prizes in both academic and theological classes. He was licensed to the ministry of the Church of Scotland in 1866, and the following year became assistant to Dr. Macduff of Sandyford Church, Glasgow. He was chosen in 1868 parish minister of Innellan, where he remained till 1886, when he took charge of the parish of St. Bernard in Edinburgh. Besides contributing to periodicals both in Europe and America, he published a number of works on religious questions, especially on the relations of religion and science, and in 1890 a volume of hymns, entitled *Sacred Songs*. He received the degree of D.D. from the University of Edinburgh in 1879, and was elected a fellow of the Royal Society of Edinburgh in 1890.

MATHEWS, WILLIAM SMITH BABCOCK, an American musical critic; born in Loudon, New Hampshire, May 8, 1837. After completing his education, carried on under private teachers and at the New Hampshire Conference Seminary, Boston, he engaged in the work of organist, teacher, and writer on musical subjects. He edited *The Musical Independent* from 1869 to 1871; was musical critic on the *Chicago Herald* from 1880 to 1883, and from 1883 to 1890 on *The Daily News*. In 1891 he began the publication of musical literature and became associate editor of *The Etude*. In 1892 he began the publication of *Music*, a monthly magazine. His writings include, *Dictionary of Music and Musicians* (1880); *Studies in Phrasing* (1882); *How to Understand Music* (1883); *New Musical Miscellanies* (1888); and *Standard Graded Course of Studies for the Pianoforte* (10 vols., 1890).

MATHILDE, PRINCESS MATHILDE LÆTITIA WILHELMINE BONAPARTE, daughter of the ex-King Jerome and Princess Catherine of Würtemberg and cousin of Napoleon III, was born in Trieste, May 27, 1820, and married at Florence, Oct. 10, 1841, to the Russian, Prince Anatole Demidoff. This union was not happy, and in 1845 they separated by mutual consent, her husband being compelled by the Czar to pay her an annuity of \$154,000. From 1849 till the marriage of Napoleon III, she did the honors at the palace of the President, and on the re-establishment of the empire was comprised among the members of the imperial family of France, and received the title of high-

ness. After the Franco-Prussian War she again took up her residence in Paris, and became famous for her artistic and literary receptions. Being an accomplished artist, she exhibited at the *Salón de Peinture* upon several occasions, and in 1861 received honorable mention.

MATHURA. See MUTTRA, Vol. XVII, p. 113.

MATINS. See BREVIARY, Vol. IV, p. 263.

MATTAWA, a river of Nippissing district, Ontario, Canada, rising in Trout Lake, near Lake Nipissing, and flowing almost directly east into the Ottawa River, at the town of Mattawa. It abounds in fish. It has a course of fifty miles through a picturesque series of lakes and rapids.

MATTEAWAN, a post village of Dutchess County, southeastern New York, on the Newburg, Dutchess and Connecticut and the New England railroads, and on Fishkill Creek, 1½ miles above Fishkill Landing. Here felt goods, hats, lawnmowers, wood-working machinery and files are manufactured. It has a circulating library of over six thousand volumes and a savings bank. Population 1890, 4,278.

MATTERHORN, called by the French *Mont Cervin*, and by the Italians *Mont Silvio*, a peak of the Alps between the Swiss canton of Valais and Piedmont, rises to the altitude of 14,775 feet. The actual peak was scaled first by Lord Francis Douglas, the Rev. C. Hudson, Hadow and Whymper, with three guides, July 14, 1865, when the three first-named and one of the guides fell over a precipice and were killed. This peak is very steep, and has been termed an obelisk of naked rock.

MATTHEWS, SIR HENRY. See LLANDAFF, VISCOUNT, in these Supplements.

MATTHEWS, JAMES BRANDER, an American author and critic; born in New Orleans, Feb. 21, 1852, graduated at Columbia in 1873, and was admitted to the bar. Taking up his residence in New York City, he devoted himself mainly to dramatic literature, fiction and literary criticism. In 1892 he was appointed lecturer on literature at Columbia College. Among his writings are *This Picture and That* (1887), a comedy; *The Theaters of Paris* (1880); *French Dramatists of the Nineteenth Century* (1881); *A Secret of the Sea, and Other Stories* (1886); *Americanisms and Criticisms* (1892); *The Story of a Story* (1893); *The Royal Marine* (1894); *Vignettes of Manhattan* (1894); *His Father's Son* (1895); and *Introduction to the Study of American Literature* (1896).

MATTHEWS, STANLEY, an American jurist; born in Cincinnati, July 21, 1824. He graduated at Kenyon College in 1840, and practiced law for a short time in Tennessee. He removed to Cincinnati and became connected with the *Herald* of that city, an ardent anti-slavery paper, which he conducted



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for several years. He was elected judge of the court of Hanover County, afterward became state senator, and from 1858 to 1861 United States attorney for the southern district of Ohio. He entered the volunteer service in March, 1861, and served in western Virginia and with the Army of the Cumberland, rising to the rank of colonel. He resigned in 1863 to become judge of the superior court of Cincinnati. In 1877 he was counsel for the Re-



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publicans in the Florida and Oregon cases before the Electoral Commission. In March, 1877, he was elected United States Senator, and took the place of John Sherman, who had resigned in order to take his place in the Hayes Cabinet. In 1881 Mr. Matthews was appointed, by President Garfield, associate justice of the United States supreme court. He died in Washington, March 22, 1889.

MATTO GROSSO ("dense forest"), an inland state of Brazil, bordering on Bolivia. Within this vast territory several great rivers rise, including the Madeira and Paraguay. The vegetation is generally scanty, high trees and rich vegetation being confined to the river valleys. The gold and diamonds of Matto Grosso have been exhausted, and agriculture (insufficient for the wants of the state) and cattle-raising are the principal industries. The former capital, Matto Grosso, decayed with the gold-mining industry, and is now a fever-haunted place with 1,500 inhabitants. By the census of 1890 the population of the state was 92,827; its area, 532,708 square miles. It is the most sparsely settled state of Brazil. See also BRAZIL, Vol. IV, pp. 234-237.

MATTOON, a city of Illinois. It is in a corn and broomcorn raising region, and is important as a shipping-center. It has the car-shops of the Illinois Central railroad. Population 1890, 6,833. See also MATTOON, Vol. XV, p. 635.

MAUCH CHUNK, a mining town, the capital of Carbon County, northeastern Pennsylvania, situated among picturesque hills on the Lehigh River, 90 miles by rail N.N.W. of Philadelphia. It is in a rich anthracite coal region. The mountain air, water and scenery of Mauch Chunk have made it a popular summer resort. There is a switchback railway, nine miles long, from the town to Summit Hill—a place famous for its "burning mines," which have been on fire since 1858. Mount Pisgah and Mount Jefferson, near here, afford beautiful views. Population 1890, 4,101.

MAUDSLEY, HENRY, an English physician; born Feb. 5, 1835. He studied medicine at University College, and graduated M.D. at the University of London in 1857. Doctor Maudsley was physician to the Manchester Royal Lunatic Hospital (1859-62); made fellow of the Royal College of Physicians in 1869, and appointed Gulstonian lecturer to the college in 1870. He also became a

fellow of University College, London; professor of medical jurisprudence in University College; consulting physician to the West London Hospital; and an honorary member of various learned societies in Paris, Vienna, Italy and America. He published several books on mental physiology and diseases. Among his writings are *The Physiology and Pathology of the Mind* (1867); *Lectures on Body and Mind* (1870); *Body and Will* (1883); *Natural Causes and Supernatural Seemings* (1886).

MAUI. See HAWAII, Vol. XI, p. 532.

MAULE, a river of Chile, rising in the Andes near lat. 36° S., and flowing westward to the Pacific. Length 150 miles, navigable for a third of the distance. Discharges 9,800 cubic feet of water per second. It is spanned by a five-span bridge, 335 feet high and 1,419 feet long. It is the northern boundary of the province of MAULE, containing 2,930 square miles of territory, and, in 1894, 129,783 inhabitants. See also CHILE, Vol. V, pp. 617, 618.

MAUMEE, a village of Lucas County, northwestern Ohio, nine miles S.W. of Toledo, on the Toledo, St. Louis and Kansas City and the Wabash railroads, on the Maumee River and on the Wabash Canal. It is in a truck-gardening and farming region, and has manufactories of reapers, glass, woolen goods, flour, paper and lumber. Population 1890, 1,645.

MAUMEE RIVER, a stream of northwestern Ohio, formed at Fort Wayne, Indiana, by the union of the St. Joseph and St. Mary's rivers, and flows E.N.E. to Lake Erie at Toledo. Length about 120 miles, of which eight miles are navigable, and at high water 50 miles as far as Defiance, Ohio.

MAUNA LOA, a volcano. See HAWAII, Vol. XI, p. 531.

MAUPASSANT, HENRI RENÉ ALBERT GUY DE, a French writer; born at the castle of Miromesnil in Normandy, Aug. 5, 1850; educated at Yvetot and the college of Rouen. Going to Paris, he became a clerk in the navy department, but was attracted toward literary work, and enjoyed the counsel of his uncle, Gustave Flaubert. He attached himself to the younger branch of the naturalistic school, and contributed to the *Soirées de Médan*. In 1879 he produced a play, *Histoire du Vieux Temps*, following it the next year with a striking volume of lyrics entitled *Des Vers* and a prose work *Boule-de-Suif*, which revealed the power of the author in the short story. His reputation was quickly made, and during the next ten years he issued nearly twenty volumes of characteristic fiction, until in December, 1891, his mind becoming unbalanced from overwork and the use of stimulating drugs, he attempted suicide. He was confined in a private asylum and died July 6, 1893. Among his best-known works are *Une Vie* (1883); *Mont-Oriol* (1887); *Pierre et Jean* and *Bel-Ami* (1888); *Fort Comme la Mort* (1889); and *Notre Cœur* (1890).

MAUREPAS, JEAN FRÉDÉRIC PHÉLYPEAUX, a French statesman; born in Versailles, July 9, 1701. When 14 years of age he inherited the office of secretary of state for the department of marine, that of the royal household and that of the city of Paris, and in 1725 took full charge. As head of the

department of marine under Louis XV, he exerted himself to improve the French commerce with such credit that great predictions were made of the brilliant part he would yet take in the government, all of which he signally falsified. In 1749 he was banished from court on account of a witty gibe which offended Madame de Pompadour, but on the accession of Louis XVI in 1774 he was recalled and made Prime Minister, holding the position until his death. Maurepas being a man of superficial knowledge and frivolous character, his administration became a hot-bed for all kinds of abuses, but was marked by two famous measures, the convocation of the parliaments and the alliance with the North American colonies in the Revolutionary War. He died Nov. 21, 1781.

MAURITANIA, a section in the N.W. of Africa. See MAURETANIA, Vol. XV, p. 636; and AFRICA, in these Supplements.

MAURITIA, a genus of tall American palms, characterized by their fan-like leaves. It yields, as do many of the palms, useful leaves, timber, fruit and wine.

MAURITIUS. The government of the British Colony of Mauritius, with its dependencies, Rodrigues, Diego Garcia, and the Seychelles Islands, is vested in a governor, aided by an executive council of seven members. There is also a council of government, consisting of the governor and 27 members, 10 being elected, 8 *ex officio*, and 9 nominated by the governor. The constitution was altered by letters-patent dated Sept. 16, 1885, which introduced an elective element into the legislature. Mauritius comprises an area of 705 square miles, and on Jan. 1, 1891, had a population of 371,655, about two-thirds of whom were Indian and 4,084 were Chinese, the remainder being mixed races, Africans and whites. The revenue of the colony in 1894 was \$2,567,008, with an expenditure of \$2,683,449. The whole debenture debt of the colony at last report was \$6,642,886. The declared value of the exports of the colony for the year 1894 was \$9,758,943, while the imports amounted to \$6,592,503. The staple export is unrefined sugar, while other exports are vanilla, aloe-fiber, cocoanut-oil, rum, hemp-fiber and caoutchouc.

The colony has two lines of railway of a total length of 105 miles, with a large revenue. There is a complete system of telegraph throughout the island. The postoffice, according to the last annual report, handled 2,406,559 pieces of mail. All accounts are kept in rupees, and since May 1, 1878, the metric system has been in force. See also MAURITIUS, Vol. XV, pp. 639-642.

MAUSOLEUM. See HALICARNASSUS, Vol. XI, pp. 383, 384.

MAUSTON, a city and the capital of Juneau County, central Wisconsin, 37 miles N.W. of Portage, on the Chicago, Milwaukee and St. Paul railroad. It has excellent schools, good water-power, and manufactures lumber, barrels and carriages. Population, 1890, 1,343; 1895, 1,547.

MAUVAISES TERRES. See BAD LANDS, in these Supplements.

MAVROCORDATOS, ALEXANDER, a Greek

statesman; born in Constantinople, Feb. 15, 1791. He took a prominent part in the struggle for the independence of Greece; presided in the first national assembly, and afterward was distinguished as a general in several battles, and at the defense of Missolonghi, Navarino and Sphacteria. When Otho was made king of Greece he was several times prime minister, and also ambassador to Prussia, England and France, holding the latter post 1850 to 1854. He was active in promoting popular education and belonged to the English party as opposed to the Russian. He died in Ægina, Aug. 18, 1865.

MAX, GABRIEL, a Bohemian painter; born in Prague, Aug. 25, 1840; educated at Prague, Vienna and Munich. He first gained distinction by his *Crucified St. Julia*. Among his other paintings, some of which have been exhibited in Munich, Vienna and Paris, are *Gretchen*; *The Infanticide*; *Light*; *The Last Token* (1874) in the Metropolitan Museum, New York and *Christ Healing the Child* (1884) in the National Gallery, Berlin. In 1883 he became a professor at the Munich Academy.

MAXEY, SAMUEL BELL, an American soldier; born in Tompkinsville, Kentucky, March 30, 1825; graduated at West Point in 1846, and served throughout the Mexican war. He resigned his commission in 1849, and the following year began the practice of law. Removing in 1857 to Paris, Texas, he continued the practice of his profession till the outbreak of the Civil War. He served during the early part of the war, in the Confederate army, first under Albert Sidney Johnston and later under General Bragg. He was promoted brigadier-general in 1862, and in 1863 assigned to the command of the military district of the Indian Territory. In 1864 he assisted General Sterling Price, and at Poison Springs attacked General Steele, capturing his entire train of 227 wagons and compelling him to retreat. For these services he was made a major-general. At the close of the war General Maxey resumed the practice of law at his home in Paris, Texas. In 1875 and again in 1881 he was elected to the United States Senate. He died at Eureka Springs, Arkansas, Aug. 16, 1895.

MAXIM, HIRAM S., an American inventor; born in Sangerville, Maine, Feb. 5, 1840. He practically educated himself, his early schooling being limited to the common institutions of his native state. While still a mere boy he showed a decided taste for mechanics, and at the age of 24 became employed in the extensive machine-shops of an uncle at Fitchburg, Massachusetts. Later he was a draughtsman in New York and Boston, and in 1877 began experimenting with electricity, making a number of useful inventions. He was among the first to make dynamo-electric machines and electric lamps, and the first to make incandescent lamp carbons by the process of "flashing" or electrically heating the carbons in an atmosphere of hydro-carbon vapors. In 1883 he turned his attention to automatic guns, exhibiting his gun, which was a wonder to scientific men, in 1884. In this machine he attempted to utilize the recoil energy of the gun to perform the functions of loading and firing, and succeeded in producing a machine that would fire six hundred

shots a minute from a single barrel. The Maxim gun was used to great advantage by the British soldiers in the Matabele war in South Africa, and was adopted in the French navy, using a one and one-half inch bore and cast-iron explosive projectiles. His latest investigations were concerning the question of aerial navigation. Among his numerous inventions are smokeless powder, incandescent lamp carbons, search-lights and an electric current regulator, for the invention of which he was made a chevalier of the Legion of Honor by President Grévy of France. He was decorated by the Sultan of Turkey with the Grand Order of the Medjidieh, and was a member of many scientific societies.

MAX-MÜLLER, FRIEDRICH, an Anglo-German philologist, and son of the poet, Wilhelm Müller,



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was born at Dessau, Germany, Dec. 6, 1823. He was educated at Leipsic and Berlin, and took his degree in 1843, after which he proceeded to Paris, where he studied Sanskrit and the sacred books of the East under Eugène Burnouf. In Germany he had previously studied Arabic and Persian, as well as philosophy and comparative philology. In 1846 he visited England

for the purpose of examining manuscripts in the East India House and at the Bodleian Library, Oxford, and in the following year was commissioned by the East India Company to edit the *Rig-Veda*, which was subsequently issued by the University Press, Oxford. In 1850 he was appointed deputy Taylorian professor of modern languages at Oxford, and four years later succeeded to the professorship. He became curator and subsequently oriental librarian of the Bodleian Library in 1856, and was elected a fellow of All Souls' College in 1858. In 1868 he was appointed professor of comparative philology at Oxford, and held the chair until 1875, when he accepted the editorship of the series of important translations of the *Sacred Books of the East*. Of the series, 49 volumes have been issued, which embrace translations of the *Upanishads*; the *Dhammapada*; the *Zend-Avesta*; the *Vedic Hymns*; the *Qur'an* (*Koran*); the *Gāita* and *Vedānta-Sūtras* the Buddhist *Mahāyāna* Texts; the *Sacred Books of China*; and the *Institutes of Vishnu*. Professor Max-Müller has the faculty of investing his subjects with life and interest for even the unlearned reader, and has specially enriched them by his successful method of approaching the history of man's religious and intellectual development by the study of human speech. He is one of the eight foreign members of the Institute of France, and was elected first president of the Aryan section at the Internationalist Congress of Orientalists, held at Stockholm in 1889. He has also been the recipient of numerous foreign decorations, and on his seventieth birthday (1893) he received addresses and congratulations from the various academies, universities and learned societies which have

enrolled his name among their honorary members. Besides this monumental work, Professor Max-Müller translated in 1890-92, and published under the auspices of the Maharajah of Vizianagram, *Sacred Hymns of the Brāhmans*, with other critical texts and commentaries on Brāhmanic, Buddhist, Pahlavi and Confucian literature and the early ceremonial law of the Orient. He has also published a *History of Sanscrit Literature* (1859), with illustrations of the primitive religions of the Brāhmans; a *Sanscrit Grammar for Beginners* (1886); and a volume of Hibbert lectures on the *Origin and Growth of Religion*, as illustrated by the religions of India (1879). Not less important have been his labors in the new science of comparative philology. The chief results of these labors appear in the series of five volumes entitled *Chips from a German Workshop*, embracing essays on philology, mythology, traditions and customs, and on the science of religion. In 1861-64 appeared the famous *Lectures on the Science of Language*, delivered at the Royal Institution, London, and in 1887-88 were published his *Lectures on the Science of Thought*. The latter were followed in 1891 by his Gifford lectures on *Natural Religion and Physical Religion*, and, two years later, a work on *Anthropological Religion; Theosophy or Psychological Religion*. He contributed the article styled ARYANS to this ENCYCLOPÆDIA. See Vol. II, pp. 672, 673.

MAX O'RELL. See BLOUET, PAUL, in these Supplements.

MAXWELL, SIR HERBERT EUSTACE, an English writer, seventh baronet of Menteith; born Jan. 8, 1845, and educated at Eton and Christ Church. After leaving college he served for a number of years in the militia, rising to the rank of major. In 1880 he was elected from Wigtonshire as a Conservative member of Parliament. From 1886 to 1892 he was a Lord of the Treasury. He published numerous papers on archæology and natural history, besides miscellaneous essays and several novels. Among his novels are *Passages in the Life of Sir Lucian Elphin* (1889); *The Art of Love* (1890); *The Letter of the Law* (1891). He was appointed Rhind lecturer in archæology at the University of Edinburgh in 1893.

MAXWELL, MARY ELIZABETH BRADDON, an English novelist; born in Soho Square, London, in 1837, the daughter of a solicitor. She very early showed a turn for literature, which she indulged in the usual manner, by sending verses and other trifles to the magazines and newspapers. Neither a comedietta brought out at the Strand in 1860, a volume of verse, nor one or two novels, had had much success, when, in 1862, *Lady Audley's Secret*, the story of a golden-haired murderess, attained an enormous popularity, in three months reaching its eighth three-volume edition. *Aurora Floyd* (1863) was little less popular. Of all her many novels, perhaps the best is *Ishmael* (1884), a tale of the second empire, which depends not so much on sensation as on character. In 1874 she married John Maxwell, publisher of *Belgravia*, the monthly magazine which Miss Braddon edited, and in which many of her later novels appeared.

MAY, EDWARD HARRISON, an American painter;

born in 1823, in England, but taken while a child to the United States; studied civil-engineering, but soon abandoned that profession for the brush. He was a pupil of Huntington in New York, and in 1851 entered the studio of Couture in Paris. One of his first works was a panorama of *The Pilgrim's Progress*. Most of Mr. May's professional life was spent in Paris, where he was a regular contributor to the annual Salons and obtained several prizes. Some of his well-known works are *Young Woman at Her Toilet*; *May and Decembor*; *Death of a Brigand*; and *Francis I Lamenting the Death of His Son*. He also painted many portraits, and ranks high as a portrait artist. He died in Paris, May 17, 1887.

MAY, SAMUEL, an American reformer; born in Boston, Massachusetts, April 11, 1810. After graduating from Harvard in 1829, he entered the ministry, and from 1834 to 1836 was pastor of a Unitarian church at Leicester, Massachusetts. He became deeply interested in the abolition movement, and was secretary of both the Massachusetts and American antislavery societies. After the termination of his ministry, he made Leicester his home, and in 1875 became a member of the state legislature. He was a contributor to *The Liberator* and *Antislavery Standard*, and published *The Fugitive Slave Law and its Victims*.—His cousin, SAMUEL JOSEPH MAY, also a reformer, was born in Boston, Sept. 12, 1797; graduated from Harvard and studied for the ministry. He was a member of the first New England antislavery society in 1832, and in 1835 became general agent of the Massachusetts Antislavery Society, traveling and lecturing extensively. In 1842, at the special request of Horace Mann, he took charge of the Girls' Normal School at Lexington, Massachusetts. In 1845 he became pastor of the Unitarian Church in Syracuse, New York, where he remained till his death, July 1, 1871. Mr. May was one of the strongest advocates of the abolition of slavery, and did much to increase the efficiency of the public-school system. As a writer, he is chiefly known by a series of papers recording his *Recollections of the Antislavery Conflict* (1868). He also published *Education of the Faculties* (1846) and *Revival of Education* (1855).

MAY, SIR THOMAS ERSKINE. See FARNBOROUGH, LORD, in these Supplements.

MAYA, doctrine of illusion. See HINDUSTANI, Vol. XI, p. 845.

MAYAGUEZ, a town. See PORTO RICO, Vol. XIX, p. 533.

MAYAPAN. See YUCATAN, Vol. XXIV, p. 758.

MAY-APPLE. See PODOPHYLLIN, Vol. XIX, p. 255.

MAYA-QUICHA INDIANS. See YUCATAN, Vol. XXIV, pp. 758-760.

MAY-BUG OR MAY-BEETLE, a name sometimes given to the cockchafer, *Melolontha*. See COLEOPTERA, Vol. VI, p. 132.

MAYENCE. See MAINZ, Vol. XV, p. 305.

MAYER, BRANTZ, an American author; born in Baltimore, Maryland, Sept. 27, 1809. He was admitted to the Maryland bar in 1829, subsequently became editor of the *Baltimore American*, and from 1841 to 1842 was secretary of legation to Mexico.

In 1863 he became a paymaster in the United States army, and served until 1871, when he retired with the rank of colonel. He published *History of the War Between Mexico and the United States* (1848); *Captain Canot*, a novel (1854); and other writings. He died in Baltimore, Feb. 23, 1879.—His nephew, ALFRED MARSHALL MAYER, an American physicist, was born in Baltimore, Nov. 13, 1836, and educated at St. Mary's College, in his native city. In 1856 he was made professor of physics and chemistry in the University of Maryland; from 1859 to 1861 held a similar position in Westminster College, Missouri. He afterward held professorships in Pennsylvania College and Lehigh University until 1871, when he accepted the professorship of physics in the Stevens Institute of Technology, Hoboken, New Jersey. While at Lehigh University as professor of astronomy, he superintended the erection of an observatory. At Hoboken he began a series of *Researches in Acoustics*, an account of which was published in the *American Journal of Science* (1871-75). In addition to numerous scientific papers, he wrote several books, including *Sport with Gun and Rod in American Woods and Waters* (1883). He was elected a member of the National Academy of Sciences in 1872. Died July 13, 1897.

MAYER, CONSTANT, a French-American artist; born in Besançon, France, Oct. 4, 1832; studied at the School of Fine Arts in Paris, and in 1857 removed to New York. He is best known by his *genre* pictures, many of which have been engraved. After 1865 he contributed frequently to the Paris Salons, and in 1869 was a chevalier of the Legion of Honor. He was elected an associate of the National Academy in 1866, and later became a member of the American Art Union. Among his works are portraits of General Grant and General Sherman, and numerous paintings, including *Maud Muller* (1867); *The Vagabonds* (1881); *The First Communion* (1886); etc.

MAYFIELD, a city and the capital of Graves County, western Kentucky, 23 miles S. of Paducah, on Mayfield Creek, and on the Illinois Central railroad. It is in a cotton-raising region, selling annually about ten million pounds of cotton raised in the vicinity. It has tobacco-houses and manufactures flour and woolen goods. It has electric lights and water-works. Population 1890, 2,909.

MAYFLOWER DESCENDANTS, SOCIETY OF. See COLONIAL SOCIETIES, in these Supplements.

MAY-FLY, the popular name for many species of EPHEMERIDÆ, Vol. VIII, p. 458.

MAYHEW, HENRY, an English journalist and litterateur; born in London in 1812. He ran away from Westminster School, was sent on a voyage to Calcutta, and on returning was articled to his father, a solicitor. Mayhew's first adventure in literature was the starting, in conjunction with Gilbert à Beckett, of *The Cerberus*, the production of which was stopped by à Beckett's father. The two youths, in disgust, left their homes, and with but three dollars between them walked to Edinburgh, hoping to make fortunes there as actors and authors at the theater of which Mayhew's brother Edward was lessee. This failed, for they were at once sent back.

In 1831 they started *Figaro in London*, and the year following, *The Thief*. In 1841, Mayhew produced *The Wandering Minstrel*, a farce, and shortly after joined with his brother Augustus in one of the most successful of literary partnerships, during which, as "the Brothers Mayhew," they produced some remarkably clever works of fiction. One of the originators and first editor of *Punch*, Mayhew was, from early in the forties, a voluminous writer on many subjects. He died July 25, 1887.—His brother, HORACE, born in 1816, also made some mark in literature, more especially of the humorous and ephemeral kind. He was a constant contributor to *Punch*, of which he was at one time subeditor. He died April 30, 1872.—Of three other brothers, THOMAS, born in 1810, was a pioneer in the publication of penny grammars, dictionaries, etc., and as editor of *The Poor Man's Guardian* was a conspicuous advocate of reform measures;—EDWARD, born in 1813, was a theatrical manager and writer of farces, and published standard works on the diseases of horses and dogs; and AUGUSTUS, born in 1826, who wrote in conjunction with his brother Henry, was the author, independently, of several successful romances. He died in 1875.

MAYHEW, THOMAS, an English colonizer and preacher; born in March, 1592; was for several years a merchant in Southampton, but, having obtained a grant of a large part of Martha's Vineyard, he removed to America in 1642. Together with his son, Thomas, who was lost at sea in 1657, he engaged in mission work among the Indians, a labor which he kept up after his son's death, and which was continued by his descendants for 150 years. He died at Martha's Vineyard, in March, 1682.—His great-grandson, EXPERIENCE MAYHEW, was born in Martha's Vineyard, Jan. 27, 1673. He became an Indian missionary and translator of parts of the Bible into the aboriginal language; was a man of great energy and force of character; wrote numerous sermons, and published a work on *Indian Converts* (1727). He died in Martha's Vineyard, Nov. 29, 1758.—He was the father of JONATHAN MAYHEW, a clergyman, born at Martha's Vineyard, Oct. 8, 1720, who, after graduating at Harvard, entered the ministry and became pastor of the West Church at Boston, where he remained until his death. He was distinguished as a preacher and controversialist, and as an ardent patriot joined with James Otis and other early opponents of English oppression. His last public act was to urge the assembly of Massachusetts to press forward the union of the colonies as the only means of perpetuating their liberties. He died in Boston, July 9, 1766. A memoir of *His Life and Writings*, by Allen Bradford, was published in 1838.

MAY LAWS or FALK LAW. See GERMANY, Vol. X, pp. 507, 508, 510.

MAYNARD, GEORGE WILLOUGHBY, an American artist; born in Washington, District of Columbia, March 5, 1843; studied in Rome and at the Royal Academy in Antwerp; in 1878 had a studio in Paris, but soon after returned to the United States and took up his residence in New York City. He was elected in 1880 a member of the Society of American Artists and of the American Water-Color Soci-

ety, and in 1885 became a National Academician. Besides numerous portraits and paintings, including *Vespers at Antwerp* (1876), *Water-Carriers of Venice* (1878), and *Strange Gods* (1885), he executed important decorative compositions for various buildings in the United States.

MAYNARD, HORACE, an American statesman; born in Westboro, Massachusetts, Aug. 13, 1814. He graduated at Amherst in 1838, and became instructor in the East Tennessee College. He was admitted to the bar of Tennessee, and practiced until 1857, when he was elected to Congress on the Know-Nothing ticket. At the outbreak of the Civil War he declared his loyalty to the United States government, suffering loss of property and persecution in consequence. In 1864 he became attorney-general of the state, and from 1866 to 1875 he served in Congress as a Representative. From 1875 to 1880 he was United States minister to Turkey, and in August, 1880, became Postmaster-General under Hayes, and served until March 4, 1881. He died in Knoxville, Tennessee, May 3, 1882.

MAYO, FRANK, an American actor; born in Boston, Massachusetts, April 19, 1839, and educated at the public schools. He made his first appearance on the stage at the American Theater, San Francisco, in 1856. He traveled through the mining towns with various companies, playing the leading parts in *Jessie Brown* and in *The Streets of New York*; in 1867 became a star, and in 1872 produced, at Rochester, *Davy Crockett*, the play in which he made his greatest success. For two years preceding his death he appeared in the title rôle of *Puddin'head Wilson*, which he dramatized from Mark Twain's story of that name. He died at Grand Island, Nebraska, June 8, 1896.

MAYO, ISABELLA FVIE, a British writer; born in London, in 1843, of Scottish descent. She was married, in 1870, to John Mayo, who died in 1877. Some of Mrs. Mayo's works are written under her own name and others under the pseudonym of "Edward Garrett." Among them are *The Occupations of a Retired Life* (1868); *The Crust and the Cake* and *Mystery of Allan Graley* (1885); *Ways and Means* (1889). In addition, she contributed numerous articles, in both prose and verse, to various magazines.

MAYO (RICHARD SOUTHWELL BOURKE), EARL OF. See INDIA, Vol. XII, p. 811.

MAYO, WILLIAM STARBUCK, an American novelist; born in Ogdensburg, New York, April 20, 1812; studied medicine at the New York College of Physicians and Surgeons, graduating in 1833. After practicing his profession for several years, he traveled in Spain and Morocco, where he found much material for the novels which he wrote after his return to America. Among his best-known books are *Kaloolah; or, Journeyings to the Djebel Kumri* (1849); *Romance-Dust from the Historic Placer* (1851); and *Never Again* (1873).

MAYOR. See MUNICIPALITY, Vol. XVII, pp. 27-31.

MAYOR, JOHN EYTON BICKERSTETH, a British clergyman and author; born in Ceylon, Jan. 25, 1825, and educated at Cambridge. He was ap-

pointed professor of Latin in the University of Cambridge in 1872. Professor Mayor was prominent in classical research, being at one time one of the editors of the *Journal of Classical and Sacred Philology* and of the *Journal of Philology*. He edited several editions of the Greek classics and published an edition of Juvenal's *Satires* (2 vols., 1878, 1886). He was the author of other important works, among them being *Bibliographical Clues to Latin Literature* (1875); and *The Latin Heptateuch* (1889).

MAYSVILLE, a city of northeastern Kentucky. It is on the Kentucky Central and the Chesapeake and Ohio railroads. Its manufactures include cotton, tobacco, cigars, furniture, lumber and flour. The city is supplied with electric and gas lights, gas fuel, electric street-railways, and has several educational institutions. Population 1890, 5,358. See also MAYSVILLE, Vol. XV, p. 651.

MAYVILLE, a village and the capital of Chautauqua County, southwestern New York, 17 miles N.W. of Jamestown, beautifully situated near the head of Chautauqua Lake, on the Western New York and Pennsylvania and the Chautauqua Lake railroads. It has regular steamboat connection with Jamestown. It is in a farming region, has flour-mills and some industries. Population 1890, 1,164.

MAZAR-I-SHARIF. See AFGHANISTAN, Vol. I, p. 243.

MAZDAK. See PERSIA, Vol. XVIII, pp. 611, 612.

MAZURANIC, IVAN. See SERBIA, Vol. XXI, p. 691.

MAZURKA, a lively dance, the music of which is three-four time with a strong accent on the second beat. It was originally danced by four or eight couples, but in America has been adapted to any number, in the same manner as the polka. In its old form it is much practiced in the south of Germany and in Poland, from whose province, Mazovia, it gets its name. The earliest records of the mazurka bear the date of the sixteenth century, was first danced in Germany in 1760 or thereabouts, and in time spread over the whole of Europe and America. To Chopin, more than to any other composer, is due the popularity of this dance.

MAZZUOLI or MAZZOLA. See PARMIGIANO, Vol. XVIII, pp. 317, 318.

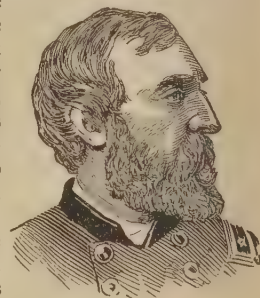
MEAD, EDWIN DOAK, an American lecturer; born in Chesterfield, New Hampshire, Sept. 29, 1849; studied at Cambridge and Leipsic. As a lecturer, Mr. Mead made a specialty of philosophy and of American politics, history and literature. He became editor of the *New England Magazine*, and wrote several critical studies in history and biography, among which may be mentioned *The Philosophy of Carlyle* (1881) and *Martin Luther* (1884).

MEAD, LARKIN GOLDSMITH, an American sculptor; born in Chesterfield, New Hampshire, Jan. 3, 1835. He removed, when quite young, to Brattleboro, Vermont, where he received his schooling. He displayed talent at an early age by modeling in snow a colossal figure of an angel, which excited much admiration. From 1853 to 1855 he studied in Brooklyn, under Henry Kirke Brown, and in the

latter year produced the *Recording Angel*. In 1857 he executed the colossal statue of *Vermont*, now placed over the dome of the state house at Montpelier. In 1862 he settled in Florence, Italy, whence he returned, bringing a model of a statue of Lincoln for the Lincoln Monument at Springfield, Illinois. He also modeled numerous statuettes and many important groups.

MEADE, FORT, in the Department of the Platte, with a post-office of the same name, and a telegraph and railroad station at Sturgis, four miles west, on the Fremont, Elkhorn and Missouri Valley railroad, in Meade County, western South Dakota. The fort is situated on the borders of the famous Black Hills region, not far from Deadwood, and is garrisoned by eight companies of cavalry.

MEADE, GEORGE GORDON, an American general; born Dec. 30, 1815, in Cadiz, Spain, where his father was an agent of the United States Navy. He graduated at West Point in 1835, and, after serving but one year in the army, during which time he was engaged against the hostile Seminoles, resigned to begin practice as a civil engineer. He was frequently employed by the government, assisting in the survey of the mouths of the Mississippi River,



GEN. G. G. MEADE.

taking part in the survey of the Texas boundary line, and subsequently in the survey of the northeast boundary line between the United States and Canada, and re-entered its military service in 1842. He served with distinction on the staffs of Taylor and Scott in the Mexican War, and in scientific work. At the close of the Mexican War he was engaged in lighthouse-construction, and for the four years preceding the Civil War he had charge of the geodetic survey of the Great Lakes. At the outbreak of the Civil War he was placed in command of a brigade of volunteers, soon rising to the command of a division of the army of the Potomac. He led his division through the "seven days' battle," being severely wounded at Glendale, through the Antietam campaign, and at Fredericksburg, where he particularly distinguished himself. At Chancellorsville he commanded the Fifth Corps; and when Hooker resigned the command of the army, and while the army itself was in hasty movement northward to check Lee's invasion of the North in 1863, Meade was appointed to the command. He accepted it with the greatest reluctance, and altogether from a sense of duty. He had inclined to fight on the line of Pipe Creek, to the south of Gettysburg; but Reynolds fell into collision with Lee's advance at Gettysburg, other corps hurried to support, and Gettysburg became historic. When Grant assumed general command in 1864, Meade continued to command the army of the Potomac under him, and mutual good feeling enabled them to maintain this delicate relation without friction, and with the best results. During the campaign which opened in

May, 1864, with the battle of the Wilderness, and closed with Lee's surrender, Meade's abilities were conspicuous, and his services were recognized by his promotion to the rank of major-general in August, 1864. At the close of the war he was placed in command of the military division of the Atlantic, a post which he held, with one short period of detached service in Georgia, until his death in Philadelphia, Nov. 6, 1872.

MEADE RIVER, a stream of northwestern Alaska, rising about 100 miles inland and flowing northeast into the Arctic Ocean, in long. $154^{\circ} 40'$ W. Its course, though not very well known, is about 175 miles long, and is through a valley rich in the lower forms of vegetation. It was discovered by Lieutenant Ray in 1883.

MEADOW-LARK (*Sturnella magna*), the popular name of a bird of the oriole family. During the summer the meadow-lark migrates to all the Northern states, returning southward in the winter. It is one of the most valuable insectivorous birds. The bird is well known on account of its sweet, plaintive notes. It often is called the American starling. See ICERUS, Vol. XII, pp. 696, 697.

MEADOW-MOUSE. See VOLLE, Vol. XXIV, pp. 278, 279; MOUSE, Vol. XVII, p. 5; and FIELD-MOUSE, in these Supplements.

MEADOW-SAFFRON. See COLCHICUM, Vol. VI, pp. 124, 125.

MEADVILLE, a city of northwestern Pennsylvania. Meadville's more recently established industries include the manufactures of engines, boilers, oil-well supplies, leather belting, wood mantels, sashes and blinds and beer. Allegheny College, located here, had, in 1896, 17 instructors, 340 students and a library of 14,000 volumes. A system of water-works, natural gas for fuel, and electric-light plants add to the natural advantages of the city. See also MEADVILLE, Vol. XV, pp. 656, 657. Population 1890, 9,520.

MEAL-WORM. See COLEOPTERA, Vol. VI, p. 133.

MEANS, Mathematical. See PAPPUS, Vol. XVIII, p. 230.

MEARES, JOHN, an English navigator; born about 1756; entered the navy and served against the French in the West Indies, becoming captain in the merchant marine after the peace of 1783. Going to India, he formed the Northwest America Company for opening trade with Russian America, and sailed from Calcutta in 1786 in a vessel of 200 tons, in which he explored a portion of the coasts of the present territory of Alaska. In 1789 two more vessels were sent out to join the first, and all three were seized by Spanish ships, on the ground that the coast and adjacent waters belonged to Spain. Meares went to England to appeal to Parliament, and as a result a fleet known as "the Spanish armament of 1790" was equipped to bring Spain to terms, but before the fleet sailed, Spain acceded to the demands of England. Captain Meares was made a commander in 1795. His discoveries, of which he published an account, formed the chief basis of the claim which England made to Oregon and British Columbia. He died in London in 1809.

MEARNS. See KINCARDINE, Vol. XIV, p. 78.

MEASON, MALCOLM RONALD LAING, a British journalist; born in Edinburgh in 1824, and educated in France, and at St. Gregory's College, Downside, near Bath. He entered the army, in 1839, as ensign of the Fortieth Regiment and served through the second Afghan and the Gwalior campaigns in India, was severely wounded, and received two medals. From 1851 to 1854 he was editor of the *Bombay Telegraph and Courier*. In 1855 he was sent to Paris by *The Daily News*, in conjunction with Blanchard Jerrold, as one of the special correspondents of the Paris exhibition of that year. From 1866 to 1870 he was editor of *The Weekly Register*. In 1870 he went abroad as special correspondent of the *New York Herald* with the French army. After Sedan he accepted an offer from *The Daily Telegraph*, and remained in France as special correspondent of that paper until the end of the war, and afterward, for two years, as correspondent for the same journal at Paris and Versailles. He joined the staff of *The Hour* in 1873. In 1865 he published *The Bubbles of Finance* and in 1866 *The Profits of Panics*, both being descriptions from life of the joint-stock swindles of the day. In 1868 he published a small volume on *Turf Frauds*.

MEASURE, in music. See MUSIC, Vol. XVII, pp. 81, 82.

MEASURES. See WEIGHTS AND MEASURES, Vol. XXIV, p. 478.

MEASURING-MACHINES. See MACHINE TOOLS, Vol. XV, p. 157.

MECCA BALSAM OR BALM OF GILEAD. See BALSAM, Vol. III, p. 293.

MECHANICAL POWERS. See MECHANICS, APPLIED, Vol. XV, pp. 752-773.

MECHANICAL SCHOOL. See TECHNICAL SCHOOLS, in these Supplements.

MECHANIC FALLS, a post village of Androscoggin County, southwestern Maine, 10 miles W. of Lewiston, on a tributary of the Androscoggin River, and on the Portland and Rumford Falls and the Grand Trunk railroads. Paper, rifles, shoes, cheese, harness, organs and furniture are manufactured here. There is also a corn-canning establishment. Population 1890, 1,283.

MECHANICS, ANIMAL STRENGTH IN. See MECHANICS, APPLIED, Vol. XV, p. 772.

MECHANICSBURG, a post village of Champlain County, western central Ohio, 17 miles N.W. of Springfield, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It is in a fertile corn and wheat-growing region, and has lumber and woolen mills, planing-mills and a machine-shop. Population 1890, 1,459.

MECHANICSBURG, a post borough of Cumberland County, southern central Pennsylvania, eight miles W. of Harrisburg, on the Cumberland Valley railroad. It is in a farming and mining region, and contains a foundry, spoke and bending works, and door and sash factories. Irving Female College (Lutheran) and Cumberland Valley Institute are situated here, and the borough has a public library, graded schools and two national banks. Population 1890, 3,691.

MECHANIC'S LIEN. See LIEN, Vol. XIV, pp. 569, 570.

MECHANICSVILLE, a post village and a railroad junction of Saratoga County, central eastern New York, 18 miles N.E. of Schenectady, on the Champlain canal, the Hudson River, and on the Delaware and Hudson and the Fitchburg railroads. It manufactures linen thread. Population 1890, 2,679.

MECHANICSVILLE, a small town of Hanover County, eastern central Virginia, seven miles N.E. of Richmond, important only for the battle which bears its name, the second of the so-called "seven days' battles," by which McClellan, in command of the army of the Potomac, effected his retreat from before Richmond. On June 26, 1862, the Confederate force under Gen. D. H. Hill made an ill-concerted attack on Fitz-John Porter, who had no difficulty in repelling the enemy at every point and inflicting on them heavy loss, placed by Swinton, on the authority of General Longstreet, at between 3,000 and 4,000, while the Federal loss was less than 400.

MECHANISM OF HEREDITY. See HEREDITY, in these Supplements.

MECKLENBURG DECLARATION OF INDEPENDENCE, a series of five resolutions alleged to have been adopted by the citizens of Mecklenburg County, in North Carolina, May 20, 1775, in view of a vote of the British Parliament denouncing the action in Massachusetts as rebellious.

Of these resolutions the general public seems to have known nothing until 1819, when, on April 30th of that year, the *Raleigh Register* printed a draft of them. The first resolution pronounces to be "enemies of this country" those who abetted the British "invasion of our rights," while the fourth and fifth provide for the preservation of order and the execution of processes pending the reorganization of government in the colonies.

The second and third are the famous ones, and read as follows:

"Resolved, 2. That we, the citizens of Mecklenburg County, do hereby dissolve the political bands which have connected us to the mother-country, and hereby absolve ourselves from all allegiance to the British crown, abjure all political connection, contract or association with that nation, who have wantonly trampled on our rights and liberties, and inhumanly shed the blood of American patriots at Lexington.

"Resolved, 3. That we do hereby declare ourselves a free and independent people; are, and of right ought to be, a sovereign and self-governing association, under the control of no power, other than that of our God and the general government of the Congress, to the maintenance of which independence we solemnly pledge to each other our mutual co-operation, our lives, our fortunes and our most sacred honor."

Jefferson at once declared the publication fraudulent, while John Adams wrote to Jefferson that had he known of such resolutions in 1776 he would have made the halls of Congress ring with them. Owing to the verbal correspondence between this series of resolutions and the phrases of the famous declaration attributed to Jefferson, a great deal of attention was drawn to the Mecklenburg declaration.

Thorough investigation followed. A committee of the North Carolina legislature in 1831 declared the claim established, and May 20th was made a state holiday. Private contemporaneous and subsequent investigations seemed to establish the fact that certain resolutions were passed at a meeting of citizens in Mecklenburg County, and that a special messenger, one Captain Jack, had been sent with the resolutions to the Continental Congress at Philadelphia; but no satisfactory evidence was adduced to prove the identity of the resolutions. By tradition, two separate sets of resolutions were passed by this convention, one on May 20th and the other on May 31st, but it was indicated that as these two dates exactly correspond with the difference between the old style and new style, and that both calendars were then in use in many places, they may have been confused in individual testimony. However, the set of resolutions passed on the 31st were twenty in number and contained no declaration of independence. These were published at once, both North and South, but the other set containing the declaration was not published until forty-four years had elapsed. It was also established that the original draft of the resolutions of May 20th was burned in 1800. The question of the authenticity of this declaration still remains in dispute, and Bancroft, in the last revision of his *History of the United States*, judiciously left the matter undetermined.

MEDAL. See NUMISMATICS, Vol. XVII, p. 630.

MEDEA'S OIL. See GREEK FIRE, Vol. XI, pp. 159, 160.

MEDEENET-HABOO, town and temples. See EGYPT, Vol. VII, p. 780.

MEDFORD, a city of eastern Massachusetts. The city is connected with Boston by electric railway, and manufactures rum, crackers, felt boots, brass castings, carriages, paper and other articles. It was made a city in 1892. It has a public library with 18,500 volumes, water-works, fire department, etc. Population 1890, 11,079; 1895, 14,474. See also MEDFORD, Vol. XV, p. 777.

MEDFORD, a city and the capital of Taylor County, central Wisconsin, 40 miles W.N.W. of Wausau, on the Wisconsin Central railroad. It is in a lumbering region, and has saw-mills, a tannery and an excelsior factory. Population 1890, 1,193; 1895, 1,518.

MEDIA, a borough and the capital of Delaware County, southeastern Pennsylvania, 12 miles S.W. of Philadelphia, on the Philadelphia, Wilmington and Baltimore railroad, has electric railway connections with Philadelphia and Chester. It is in a rich agricultural region, and contains the Delaware County Institute of Science, an academy with a library containing some three thousand volumes, and the State Training School for Feeble-Minded Children. Population 1890, 2,736.

MEDICAL ASSOCIATIONS IN THE UNITED STATES, societies for the promotion of professional fellowship, the comparison of medical theories and modes of practice, and the consid-

eration of measures to improve and elevate the science and the art of medicine. Naturally, these associations are as various as the different schools, or sects, of medicine. By far the greater number are associations whose members are the so-called "regulars." Others are associations of the homœopathic school, the eclectic school, etc. The general plan of organization is as follows: Physicians of the same school in a county form themselves into a county medical society. Of these county societies there are many thousands in the United States. Districts of a state embracing a number of counties may form similar societies. Delegates from the county or district societies meet and constitute the state medical society. The meeting of the state societies, as a rule, are held yearly, and those of the county or district societies oftener, as may be desired. All have officers common to deliberative bodies and the proceedings of their meetings are governed by the rules of parliamentary law. Associations having for their object the consideration of certain special subjects, as public health, the cure of inebriates, the influence of climate on health, the use of the microscope, etc., are classed as medical societies, and hold annual meetings for the transaction of business. Delegates from state or county or district societies meet, and constitute the National Medical Association, whose sessions are yearly. In all these associations the members pay annual dues, and their proceedings are published in book or pamphlet form, and distributed to the members.

Of the medical associations formed during the eighteenth century in the United States may be named the following, with date of organization:

New Jersey State Medical Society	1766
Massachusetts Medical Society	1781
College of Physicians of Philadelphia	1787
Medical and Chirurgical Faculty of Medicine	1799
Medical Society of Delaware	1789
Medical Society of South Carolina	1789
New Hampshire Medical Society	1791
Connecticut State Medical Society	1792

Of the national associations the chief is the American Medical Association, organized in New York in 1846. Membership in this society is obtained by any member of a state or county medical society recognized by the association. The annual dues are five dollars. This body is so large, and the range of topics considered so wide, that it resolves itself into sections for the better transaction of business, members attending those sections in which they are most interested. Another very important society is the Association of American Medical Colleges, organized in 1890, having for its object the full consideration of medical education in the United States. Its members are, for the most part, the faculties of medical colleges in the United States. It is this association which recently has formulated courses of study and of lectures for the medical colleges of the United States, with a view to a greater uniformity in methods of teaching and the higher qualifications of medical graduates. The following list of national associations, with date of organiza-

tion, will best show the diversity of schools and subjects of paramount interest at the present time:

American Academy of Medicine	1876
American Anti-Vivisection Society	1883
American Association for the Study and Cure of Inebriates	1870
American Association of Genito-Urinary Surgeons	1886
American Association of Obstetricians and Gynecologists	1888
American Association of Official Surgeons	1888
American Association of Physio-Medical Physicians and Surgeons	1883
American Branch of the English Society for Physical Research	1890
American Climatological Association	1883
American Dermatological Association	1876
American Electro-Therapeutic Association	1891
American Gynecological Society	1876
American Health-Resort Association	1891
American Institute of Homœopathy	1844
American Laryngological Association	1878
American Medical Association	1846
American Medico-Psychological Association	1892
American Neurological Association	1875
American Obstetrical Society	1885
American Ophthalmological Society	1864
American Orthopædic Association	1887
American Otological Society	1868
American Pædiatric Society	1888
American Physiological Society	1887
American Postal Microscopical Club	1875
American Public Health Association	1872
American Rhinological Association	1883
American Society of Microscopists	1878
American Surgical Association	1880
American Volunteer Corps	1888
Association of Acting Assistant Surgeons, United States Army	1888
Association of American Anatomists	1888
Association of American Colleges	1890
Association of American Physicians	1886
Association of Medical Officers of American Institutions for Idiotic and Feeble-Minded	1876
Association of Military Surgeons of the National Guard, United States	1891
Conference of State Medical Examining and Licensing Boards	1891
International Hahnemannian Association	1880
International Medical Congress	
International Medical Missionary Society	1881
Medical Guild of the Misericordia	
Mississippi Valley Medical Association	1875
National Association of Homœopathic Medical Examiners	1891
National Association of Members of Committees of Medical Legislation	1891
National Association of Railway Surgeons	1888
National Board of Health (organized by act of Congress)	1879
National Conference of State Boards of Health	1884
National Eclectic Medical Association	1848
New England Psychological Society	1875
Pan-American Medical Congress	1891
Rocky Mountain Medical Association	1871
Sanitary Council of the Mississippi Valley	1879
Southern Homœopathic Medical Association	1885
Southern Surgical and Gynecological Association	1887
United States Medical Practitioners' Protective Alliance	1890
Western Academy of Homœopathy	1875
Western Association of Obstetricians and Gynecologists	1891

MEDICAL EDUCATION IN THE UNITED STATES. The changes and improvements in medical teaching in the United States during the past one hundred years are not less important than the results which have been achieved in the

prosecution of the study of medical science. When we contemplate the larger medical schools of to-day, richly provided, as they are, with every kind of appliance to facilitate teaching, with departments excellently arranged for the study of normal and pathological anatomy and physiology, and provided with the necessary apparatus and instruments, their well-stocked museums and numerous departments for clinical teaching—when we look at all these, and establish a comparison with the inadequate beginnings which were made in such things in the last century, we recognize at once how much has been done since then. At the present time all the appliances and methods in use are considered indispensable for the proper and thorough teaching of medical students, whereas then they were entirely wanting, or at least but poorly employed. There is now another form of instruction. Practical demonstrations have become, by degrees, of supreme importance, while theoretical lectures have, by degrees, nearly been abandoned. Division of labor has assumed a definite form. The lecturer concerns himself exclusively with one or two subjects, and thus attains the ability and skill of a virtuoso. Dissection, once a felony, is now lawful. Subjects no longer are stolen from the graveyards under cover of darkness, but come to the schools under the sanction of the state in the full light of day. The development of electrical science and apparatus has contributed to the diagnosis of diseases and their localization in the body, while modern chemistry has given to the physician efficient medicines in palatable form, and to the surgeon a sure and safe means of operating quickly and without pain. The discovery of the cause of specific diseases by bacilli, and a rational treatment by inoculation or by antisepsis, has revolutionized the theory and the practice of medicine. In no other form of instruction is there such a radical and wide departure from the precedents of a hundred years ago as is now found in the schools for medical education in the United States.

The earliest medical practitioners in the American colonies were the medical officers of the companies by whose agency the colonies were established. The first permanent resident physician in the United States was Dr. John Pot (1610), in Virginia. Dr. Samuel Fuller, who came over on the *Mayflower* in 1620, was the first physician in New England. The supply for the medical profession of the young colonies was twofold, foreign and domestic. During the seventeenth century many educated European physicians emigrated to America, as Dr. John Clark of Boston in 1638, Dr. Thomas Thacher in 1635, and Dr. Robert Child in 1644. Of the domestic practitioners a certain number, after acquiring at home some preliminary education, went to Europe to study medicine in the European universities, as William Shippen and Benjamin Rush, who studied at Edinburgh; William Hunter of Newport, who was a pupil, in London, of his famous cousin, John Hunter; and James Smith of New York, whose medical training was gained at Leyden. Many

of the better physicians of the later colonial period, after taking degrees in America, went to Europe for greater advantages, as did Dr. Valentine Mott. But by far the larger number of domestic physicians were educated by means of the defective school facilities of the colonies themselves. Medical students from fourteen to eighteen years of age entered the office of some doctor, under apprenticeship for the term of three to seven years. They learned to grind drugs, mix powders, make ointments, plasters, tinctures, etc., to extract teeth, to cup and to bleed, and to perform minor operations in surgery. In time the student accompanied his master to the bedside of the patients, to feel the pulse or look at a furred tongue. Possibly an amputated limb may have been given him to dissect. At the expiration of the apprenticeship, with a certificate from his preceptor that he had attended faithfully to his studies, etc., the student set up in business for himself and plunged into the duties of his profession—to salivate, to physic and to bleed his patients, as was the practice of that time. Doctors in those days bought herbs and drugs at the general stores and compounded their own medicines, which were carried in saddle-bags. The practice of medicine was, of course, pure empiricism—the newly-fledged doctor simply imitated his teacher, unless he were gifted with a rare talent for original investigation.

Though the anatomical lectures of Giles Firman, delivered at Harvard College prior to 1647, were the first public medical instruction in the United States, the earliest medical school was the institution now known as the Medical Department of the University of Pennsylvania, founded by Dr. John Morgan and William Shippen at Philadelphia in 1765. This was followed speedily by the school now known as the College of Physicians and Surgeons, under the charter of King's College, New York City, in 1767. The medical department of Harvard University was founded in 1783, the College of Philadelphia in 1790, and the medical school of Dartmouth in 1798. These five schools were the only ones in the United States prior to the nineteenth century. By degrees all the states of the Union have established colleges and universities, in 1836 as many as 79, 38 of which enjoyed the right to "make doctors"; down to 1876 there were 59 authorized to confer degrees. The following are the more important medical colleges that have been established during the present century, with date of organization:

Medical Department of University of Maryland, Baltimore	1811
Medical Department of Yale University, New Haven, Connecticut	1814
Bowdoin College and Medical School, Brunswick, Maine	1820
Medical College of Ohio, Cincinnati	1819
Medical School of State of South Carolina	1825
Columbia University, Washington, District of Columbia	1822
Jefferson Medical College, Philadelphia, Pennsylvania	1826
University of Georgia, Augusta	1829

Tulane University, New Orleans, Louisiana	1834
University of Louisville, Louisville, Kentucky	1837
Rush Medical College, Chicago	1837
Albany Medical College	1839
Medical College of Virginia	1839
Missouri Medical College, St. Louis, Missouri	1840
University of City of New York	1841
St. Louis Medical College	1842
Cleveland Medical College	1842
Eclectic Medical Institute, Cincinnati, Ohio	1843
Hahnemann Medical College, Philadelphia, Pennsylv-	1843
ania	
University of Buffalo	1846
Homœopathic Hospital College, Cleveland, Ohio	1849
Woman's Medical College, Philadelphia, Pennsylv-	1850
ania	
University of Michigan, Ann Arbor, Michigan	1850
Miami Medical College, Cincinnati, Ohio	1852
University of Vermont, Burlington	1854
Atlanta Medical College, Atlanta, Georgia	1856
Medical College of Alabama, Mobile	1859
Northwestern University, Chicago Medical College	1859
Long Island College Hospital, Brooklyn	1859
Hahnemann Medical College, Chicago	1859
Bellevue Hospital College, New York	1861
Homœopathic Medical College, New York	1861
Eclectic Medical College of New York	1865
Bennett College, Chicago	1868
Louisville Medical College, Louisville, Kentucky	1870
University of Iowa, Iowa City	1870
College of Physicians and Surgeons, Baltimore	1872
Boston University	1873
Vanderbilt University, Nashville, Tennessee	1874
Chicago Homœopathic Medical College	1876
University of Tennessee, Nashville, Tennessee	1877
St. Louis College of Physicians and Surgeons	1879
Iowa Medical College (Drake University) Des	
Moines	1881
Minnesota Hospital College, Minneapolis	1881
New York Polyclinic	1882
New York Post-Graduate Medical School	1882
College of Physicians and Surgeons, Chicago	1882
Cooper Medical College, San Francisco	1882
Detroit College of Medicine	1885

There have been organized, in the United States, nearly three hundred medical colleges, of which, in 1891, only 135 were in existence. Seven of these are colleges exclusively for women, and 45 for both sexes. In 1890 there were registered 14,884 students, and the number graduating was 4,492.

The medical schools of the United States, like the hospitals to which they are attached, are, as a rule, private enterprises, the state neither paying for their maintenance nor contributing to their support, and consequently exerting little, if any, influence on their organization and administration. Several physicians living in the same locality unite for the purpose of imparting instruction in medicine, but chiefly for the increased practice and emoluments that come to them by virtue of their connection with such an institution. Until within the last twenty years no one made inquiry as to the qualifications of their graduates. The schools accordingly differed greatly in merit; some, as the New York College of Physicians, the Bellevue Hospital College of New York, and the Rush Medical College of Chicago, enjoying a high reputation, while others occupied a low position intellectually and morally, and a few trafficked in doctor's diplomas; some had large, well-ventilated lecture-rooms, laboratories, museums, libraries, etc., while

others were poorly equipped. Medical schools connected with state institutions of learning, and so supported wholly or in part by tax, were better equipped in every way, were more independent of patronage, and could consequently demand higher standards for admission and graduation. Until recently, applicants were admitted to lectures without examination even in the rudiments of a common-school education; they were obliged to attend two courses of lectures; but, as the scheme of study was not graded at all, the same lectures were heard twice, and an examination for a degree was seldom severe, especially when from \$25 to \$50 was paid for the diploma. The fear that tests for admission, or a graded curriculum, or an extended course of study, would result in a loss of pupils and decreased income long kept those who deplored the low state of medical proficiency from taking measures to improve it. The creation, by law, of state boards of health to inquire into the qualifications of practicing physicians, and to license such as may be found qualified, has been a potent factor in raising the standards of medical schools in the United States. Another strong influence has been the action of the American Medical College Association in adopting rules for the admission of colleges to membership in the American Medical Association, whereby all colleges were to have a graded course of study, covering a period of not less than three courses of lectures of six months each; oral and written examinations for all students; a thorough course of laboratory instruction in chemistry, histology and pathology; an entrance examination in English composition; translations of easy Latin prose; higher arithmetic; the elements of physics, botany, chemistry, physiology and biology; geography; and history. This association also adopted a college course of study which required the teaching of anatomy, physiology, chemistry, materia medica, theory and practice of medicine, pathology, surgery, obstetrics and gynecology, hygiene, medical jurisprudence, dissection (two courses), two terms of hospital and clinical instruction, diseases of women and children, dermatology, ophthalmology, otology, laryngology, dental pathology and surgery, toxicology, etc.

By the better part of the profession higher standards of medical education had long been contemplated and desired. But in the old and regular schools, tradition and inertia were hard to overcome. However, in 1853, the homœopaths introduced a graded course into the Penn University of Philadelphia, and the school ceased to exist ten years later. In 1869 it was adopted in the Hahnemann College of Philadelphia, and in 1872 in the New York Homœopathic College. The Women's College next adopted it, and in 1868 the Women's Medical College of the New York Infirmary. Soon after, the Woman's Medical College of Pennsylvania, in Philadelphia, followed. Among the "regulars," the Chicago Medical College of the Northwestern University was using a graded course in 1866, and Harvard led the way in the East in 1871, and suffered no loss

in numbers, while making a gain in matriculates previously educated in liberal studies. Six years later, the University of Pennsylvania enrolled itself in the same ranks, with like results. The course of lectures on which attendance is now required for a degree is, in the better class of colleges, substantially that recommended by the American Medical College Association. Of the 135 colleges in the United States in 1891, 129 exacted certain educational qualifications for entrance, and 85 required three or more courses of lectures as a condition of graduation. One hundred and twenty-three had a chair of hygiene, and 119 one of medical jurisprudence. The average duration of lecture terms was 26 weeks each. In those institutions which have adopted real tests of fair literary attainments as a condition of entrance, the result has been an increase of matriculates possessing diplomas from colleges and schools of science. Thus the ratio of such matriculates to the whole number of students at Yale, Harvard, Columbia College, New York, the University of New York and the University of Pennsylvania was about one third. Sixteen of the regular schools furnishing the information necessary for the estimate were attended by about 2,000 students, of which 23 per cent, or nearly three times the average, had received previous degrees in letters or science.

Nearly all the states now prohibit a physician from practicing medicine without first obtaining a license from some official board of censors. These boards are appointed in various ways, in some states by the governors, in others by judges of the courts, or by state medical societies. The requirements of these boards are also various; by some, a diploma from a medical college is all that is necessary, but those who are not graduates must submit themselves to examination. In some cases ten years' practice is considered equivalent to the possession of a diploma. Connecticut contents herself with imposing upon strolling characters a license fee of \$20 a day for each day of practice in the state, which is virtually prohibitory. Most of the legislation concerning the regulation of the practice of medicine is within the last twenty years, and it is to be regretted that much of it is a dead letter. But the existence of legislation of this character indicates a sense of the importance of the subject, and serves to elevate the standard of medical teaching. The tendency of the statutes is in the direction of holding medical societies responsible for the qualifications of their own members. These societies comprise the best men in a profession which is by no means devoid of scholars highly accomplished in letters and science. In all the larger cities of the United States, which have medical colleges, the work of the colleges is supplemented in what are called post-graduate schools. In these schools clinical instruction is afforded, and the students can pursue certain definite studies, or prepare themselves as "specialists." The need of such schools has long been felt, and they are well patronized, not only by

students just graduated, but also by doctors from the rural districts, who feel the need of "brushing up" and of "keeping up with the times."

The admission of women to lectures on medicine was opposed strongly at first by the medical profession. The refusal of the established schools to open their doors to women led to the organization of a Woman's Medical College in Philadelphia in 1850. Its teachers and pupils being denied access to the hospitals of that city, the friends of the institution, in 1861, established in its neighborhood a Woman's Hospital, which now receives over 4,500 patients annually. In 1852 a society was incorporated in Boston for the training of midwives, nurses and female physicians; and in New York a dispensary was opened in 1854, which, three years later, was converted into a hospital. In this institution clinical privileges were obtained, which elsewhere were denied to women. At the present day the right of a woman to practice medicine in the United States seldom is questioned, and colleges for their instruction in medical science are to be found in Chicago, New York, Boston, Philadelphia and other cities.

It may be of interest to note that practical anatomy was taught in the colonies to some extent in the middle of the eighteenth century, subjects for dissection being the bodies of executed criminals. There were secret dissections at Harvard College in 1771, 12 years before the organization of its medical department. No special professor of physiology existed in any medical school in the United States during the eighteenth century. Midwifery during the first half of the century was wholly in the hands of the women. In 1767 the first regular professor of obstetrics was appointed in King's College, New York. In 1789, Dr. George Buchanan of Baltimore delivered the first course of lectures on the diseases of women and children. The first law to regulate the practice of medicine and surgery in the colonies was passed in New York in 1760. This example was followed by New Jersey in 1772. Up to the Revolutionary War, medical literature in the colonies consisted of but one medical book, three reprints, and about twenty pamphlets. Literary contributions were mostly in the form of *Transactions* of medical societies. The earliest medical journal in the United States was *The Medical Repository* (1771-1828), followed by the *Philadelphia Medical Museum* in 1804. The number of medical journals in the United States in 1893 was 232.

MEDICAL LAKE, in Spokane County, Washington, so called from the peculiar character of its water. A good quality of soap is made from the water by condensation, and it contains ingredients said to be very valuable in the cure of rheumatism, catarrh and skin and stomach complaints.—The village of MEDICAL LAKE takes its name from the above body of water, and is situated 12 miles W.S.W. of Spokane, on the Seattle, Lake Shore and Eastern and the Northern Pacific

railroads. It has large hotels for the accommodation of the many health-seekers who come here, and excellent granite is quarried and shipped. It is the seat of the Eastern Washington Hospital for the Insane. Population 1890, 617.

MEDICINE LODGE, a city and the capital of Barber County, southern Kansas, on the Atchison, Topeka and Santa Fé railroad, 90 miles S.W. of Wichita. It is the center of a grain and stock-growing region. Population 1890, 1,095.

MEDICK (*Medicago*), same as **ALFALFA**. See **FORAGE PLANTS OF THE UNITED STATES**, in these Supplements.

MEDILL, JOSEPH, an American journalist; born in New Brunswick, Canada, April 6, 1823; removed to Ohio when a boy, and until he was 21 years old worked on his father's farm; studied law and began its practice at New Philadelphia, Ohio. He founded a Free Soil and Whig newspaper in Cleveland, Ohio, and in 1855 purchased an interest in the *Chicago Tribune*, of which he became the chief editor. He was a member of the Illinois constitutional convention in 1870, and was the author of the minority representation provision. In 1871 he was appointed, by President Grant, a member of the first United States civil service commission, and in the same year was elected mayor of Chicago.



JOSEPH MEDILL.

MEDINA, a post village of Orleans County, northwestern New York, 15 miles E. of Lockport, on the Erie canal, and on the New York Central and Hudson River railroad. It has manufactories of flour, carriages, pumps and farming-tools. It has six quarries of the well-known Medina sandstone, good waterpower, derived from Oak Orchard Creek, and is supplied with banks, newspapers and an academy. Population, 1890, 4,492.

MEDINA, a post village and the capital of Medina county, central northern Ohio, 34 miles S. of Cleveland, on the Cleveland, Lorain and Wheeling and the Northern Ohio railroads. It contains a normal school, flour, saw and planing mills, a foundry and other manufactories. Population 1890, 2,073.

MEDING, OSKAR, a German novelist, who wrote under the pseudonym "Gregor Samarow"; born April 11, 1829, at Königsberg, being the son of the governor of East Prussia. He studied law in his native town, at Heidelberg and Berlin, from 1848 to 1851, when he became an advocate at Marienwerder. At a later period he was employed in the magistracy and administration, and in 1859 he quitted the public service of Prussia and joined that of Hanover, in which he rose to the position of counselor of state. Sent on a mission to the Elector of Hesse in 1866, he returned to Hanover at the time of the Prussian

invasion of that country, rejoined the king, who was with the army, and after the catastrophe of Langensalza followed the king to Vienna. He went to Paris in the following year as the representative of the interests of the deposed king. In 1870 he gave his adhesion to the Prussian government, and after residing two years in Switzerland and at Stuttgart he settled in Berlin, where, keeping wholly aloof from politics, he began to write his personal reminiscences in the form of novels, under the famous pseudonym already named. Of these may be mentioned *Um Zepter und Kronen* (1872-76); *Die Römerfahrt der Epigonen* (1873); *Höhen und Tiefen* (1879-80); *Saxoborussen* (1885); *Gipfel und Abgrund* (1888); and *Der Weisse Adler* (1891). Under his own name he published *Memoiren zur Zeitgeschichte* (1881) and a biography of William I of Germany, with corrections and additions by the Emperor.

MEDULLA OBLONGATA. See **ANATOMY**, Vol. I, pp. 870, 871.

MEDULLA SPINALIS OR **SPINAL CORD**. See **ANATOMY**, Vol. I, pp. 865-867.

MEDUM OR **MEYDOOM**. See **EGYPT**, Vol. VII, p. 773.

MEDUSÆ. See **HYDROZOA**, Vol. XII, pp. 550-554.

MEEK, ALEXANDER BEAUFORT, an American jurist and journalist; born in Columbia, South Carolina, July 17, 1814; graduated at the University of Alabama, and in 1835 was admitted to the bar, beginning the practice of law in Tuscaloosa, Alabama; served in the Seminole war, and was judge of the county court of Tuscaloosa. When a member of the state legislature, he secured the passage of the bill establishing the public schools of Alabama. His later years he spent in literary work. He edited *The Southron* in 1839, and, in addition to his journalistic writings, was the author of a legal digest, and of several verse and prose works, comprising *The Red Eagle* (1855); *Songs and Poems of the South* (1857); and *Romantic Passages in Southwestern History* (1857). He died in Columbus, Mississippi, Nov. 30, 1865.

MEEK, FIELDING BRADFORD, an American palæontologist; born in Madison, Indiana, Dec. 10, 1817. He first engaged in mercantile pursuits until 1848, when he became an assistant in the United States geological survey of Iowa, Wisconsin and Minnesota. During 1852-58 he assisted James Hall in his palæontological work in the state of New York, except in summers, when he was engaged in field-work. After 1858 he resided in Washington, District of Columbia, and devoted his time to investigating the organic remains gathered by the government exploring expeditions. The invertebrate palæontology of the Rocky Mountains, as developed by the survey of Professor Hayden, was intrusted to Mr. Meek. He also studied the palæontology of Illinois, Ohio, California and of several of the territories. His works include *Checklist of the Invertebrate Fossils of North America* (1864) and *A Report on the Invertebrate Cretaceous and Tertiary Fossils of the Upper*

Missouri Country (1876). He died in Washington, District of Columbia, Dec. 28, 1876.

MEGABYZOS. See PERSIA, Vol. XVIII, p. 574.

MEGALICHTHYS, a genus of extinct ganoid fishes, found in Carboniferous strata in Europe. The remains consist largely of big bony plates and immense teeth. They are believed to have been of great size.

MEGALOSAURUS. See REPTILES, Vol. XX, p. 443; GEOLOGY, Vol. X, p. 358.

MEGANTIC LAKE, a body of water in Quebec, between Compton and Beauce counties, near the boundary of the state of Maine. It is in a very picturesque region, and extends northward for 15 miles, flowing out, through Chaudière River, into the St. Lawrence; width, three miles. It abounds in fish.

MEGASTHENA, an order, arranged by Dana, including the large mammals below man, which possess superior mental and physical strength. The group included the quadrumanous, the carnivorous, the herbivorous and the cetaceous mammals. This was the second of the four orders of mammals, according to Dana. The order is equivalent to Owen's second order, *Gyrencephala*.

MEGASTHENES, an ancient Greek historian. See INDIA, Vol. XII, 786-788.

MEGERLE, ULRICH. See ABRAHAM A SANTA-CLARA, Vol. I, p. 55.

MEHEMET ALI. See EGYPT, Vol. VII, pp. 760-766.

MEIGGS, HENRY, an American railroad contractor; born in Catskill, New York, July 7, 1811. For several years he was in the lumber business in New York City and afterward in San Francisco, but in the financial crisis of 1854 his debts amounted to a million dollars, and he fled to South America. He then engaged in building bridges on the Valparaíso and Santiago road, in Chile, and later constructed railroads in that country, from which he realized a profit of over a million and a half dollars. He next undertook the building of six railroads in Peru, three of which he completed, and the remainder were in course of construction when he died. One of these, the Callao, Lima and Oroya road, ranks among one of the most daring achievements of modern engineering. Before his death Mr. Meiggs met all of his former obligations in the United States, and during his lifetime donated large sums to various charities. He died in Peru, Sept. 29, 1877.

MEIGS, JAMES AITKIN, an American physician; born in Philadelphia, July 31, 1829, and received his education at Jefferson Medical College. He held the chair of physiology in the Pennsylvania Medical College; was also professor of the institutes of medicine in Philadelphia College of Medicine, and a member of various medical societies, both in the United States and Europe. His articles on craniology and ethnology are of value. He died in Philadelphia, Nov. 9, 1879.

MEIGS, RETURN JONATHAN, an American soldier; born in Middletown, Connecticut, Dec. 17,

1734. He entered the American army at the beginning of the Revolutionary War, became a major, and in 1777 a colonel. In that year, at the head of 170 men, he attacked the British troops at Sag Harbor, Long Island, captured 90 prisoners and destroyed 12 vessels without the loss of a man. In 1801 he was appointed Indian agent of the Cherokees, and lived among them till his death at the Cherokee Agency, Georgia, Jan. 23, 1823. He was one of the earliest settlers in Ohio, removing there in 1788.—His son, RETURN JONATHAN, JR., was born in Middletown, in November, 1765. After graduating from Yale in 1785, he removed with his father to Ohio, and began the practice of law in Marietta in 1788, and in 1803-04 was chief justice of the state supreme court. In 1807 he was appointed judge of the United States district court of Michigan, and in 1809-10 was a United States Senator from Ohio. From 1810 to 1814 he was governor of his state. He then became Postmaster-General in President Madison's Cabinet, and continued to hold the office until 1823, when he retired to Marietta to pass the remainder of his life, and died there, March 29, 1825.—CHARLES DELUCENA MEIGS, great-grandson of the first Return Jonathan; born in St. George, Bermuda, Feb. 19, 1792. He began the practice of medicine in Augusta, Georgia, but in 1814 went to Philadelphia, and received the degree of M.D. from the University of Pennsylvania in 1817. From 1841 to 1861 he was professor of obstetrics and the diseases of women and children in Jefferson Medical College. He published several works in his department of medicine. He died June 22, 1869, in Delaware County, Pennsylvania.—His son, MONTGOMERY CUNNINGHAM MEIGS, was born in Augusta, Georgia, May 3, 1816; graduated at the United States Military Academy in 1836, and was appointed to the artillery, but transferred the following year to the engineer corps. For many years he was occupied in the engineering service on the sea-coast and in the construction of the government works at Washington, District of Columbia, and elsewhere. On May 14, 1861, he was promoted colonel of the Eleventh Infantry, and the following day was made quartermaster-general of the United States army, with the rank of brigadier-general. This post he held until his retirement from active service in November, 1882. During the whole of the war General Meigs was engaged in directing the equipment and supplies of the armies in the field. He received the brevet of major-general, July 5, 1864. In 1876 he was a member of the commission for the reorganization of the army, and after his retirement in 1882 served as architect of the Pension Bureau Building at Washington, which was completed in 1887. He was a regent of the Smithsonian Institution. He died in Washington, District of Columbia, Jan. 2, 1892.

MEIKONG. See MEKONG, Vol. XV, p. 832.

MEILHAC, HENRI, a French dramatist; born in Paris, Feb. 23, 1831; was educated at the Lycée Louis-le-Grand. From 1852 to 1855 he

contributed with pen and pencil to the *Journal pour Rire*, and in 1855 his first dramatic efforts, *Satania* and *Garde-Toi, je Me Garde*, were produced at the Palais Royal, but without much success. In 1860, in collaboration with Ludovic Halévy, he wrote *L'Étincelle* and *Une Heure Avant l'Ouverture*, both played at the Vaudeville; and in 1861, with M. Arthur Delavigne, *La Vertu de Célimène*, produced at the Gymnase, which became very popular, notwithstanding its improbable plot. In conjunction with the above-mentioned authors, M. Meilhac produced a large number of plays, the chief among them being *La Belle Hélène*; *Barbe Bleue*; *Frou-frou*; *La Cigale*; *Décoré*; *Margot*; and others. He was decorated with the ribbon of the Legion of Honor in 1869, promoted to officer in 1884, and in 1888 entered the Academy in succession to Labiche. Died July 6, 1897.

MEINAM or MENAM, a river. See SIAM, Vol. XXI, p. 850.

MEISSEN, HEINRICH VON. See FRAUENLOB, Vol. IX, p. 727.

MEISSNER, ALFRED, a Bohemian poet; born in Töplitz, Oct. 15, 1822; studied medicine at the University of Prague, but, turning his attention to literature, published his first volume of poems in 1845. He removed in 1846 to Leipsic, where he finished *Ziska*, an epic poem which met with great success, but, on account of its revolutionary spirit, its sale was prohibited in Austria. To escape arrest he fled to Paris, where he became intimate with Heine. He returned to his native country two years later and published his *Recollections of Heinrich Heine*. He also wrote several novels; among them, *Zwischen Fürst und Volk* (1855); *Sansara* (1858); and *Schwarzgelt* (1864). His last years were embittered by an unfortunate literary partnership, which drove him to attempt suicide. At length, utterly broken down, he died in Bregenz, May 29, 1885.

MEISSONIER, JEAN LOUIS ERNEST, a French figure-painter; born in Lyons, Feb. 21, 1815.



J. L. E. MEISSONIER.

When he was still a child his father established a pharmacy in Paris, and the son, having resolved upon art as a profession, studied under Jules Potier and Léon Cogniet. His drawings were praised by Johannot, and about 1833-34 he was employed by Curmer, the publisher, on designs for the Royau-ment Bible and other works. He first made a distinct mark in 1838 and by his illustrations to *Paul and Virginia* and the *Chamrière Indienne*. In 1834 he began to contribute to the Salon. Two years later he exhibited the first of his various groups of *Chess-Players*. It was followed by a long series of elaborate and successful *genre* pictures, in which, with the most careful and finished execution and with the most perfect veri-

similitude of costume and local coloring, the artist depicted the civil and military life of the seventeenth and eighteenth centuries, passing to subjects of *genre* or history taken from the nineteenth century. Among the most celebrated of his military scenes may be named *La Rixe*, presented to the Prince of Wales by Napoleon III. Besides this are his famous pictures belonging to the Napoleonic series, of which 1807 was sold to a New York gentleman for \$60,000, and 1814, in 1890, changed hands in Paris for \$100,000. He also executed some striking portraits. In all, over 400 of his paintings are known to exist, about 60 of which are owned in the United States. Finally, we may refer to his design for the decoration of the Panthéon—"the apotheosis of France"—the cartoons of which were exhibited to the commission in 1889. He became a commander of the Legion of Honor in 1867 and a member of the institute in 1861. He was a member of all the principal art academies of Europe and received various honors and orders at international exhibitions and from the sovereigns of various countries. He died in Paris, Jan. 31, 1891.

MEISTERSÄNGER or MASTERSINGERS. See GERMANY, Vol. X, p. 526; and MUSIC, Vol. XVII, pp. 83, 84.

MEJIA TOMÁS, a Mexican soldier; born about 1812, of Indian parentage, in the state of Guana-juato. He was uneducated, and rose from the ranks. In the war with the United States he fought against Taylor, and subsequently joined the Conservative or Church party, becoming in its interests a supporter and one of the most trusted generals of Maximilian, to whom he looked for a restoration of clericalism in his native land. After the overthrow of the empire he was executed, together with Maximilian and General Miramón, June 19, 1867.

MEKHITAR. See MECHITARISTS, Vol. XV, p. 774.

MEKLONG, a river and town. See SIAM, Vol. XXI, p. 853.

MELAMET, DAVID, a German composer; born in Prussia in 1861, and, being celebrated as a boy for his fine soprano voice, made a concert tour when but twelve years old. After studying in Berlin and becoming a singer and chorus conductor, he removed to the United States. In 1888 he became director of the Germania Männerchor in New York. His *Columbus* won the prize for the best cantata for the German Columbian celebration at New York in 1892.

MELAMPUS, an ancient soothsayer, a son of Amythaon and Eidomene; looked upon as the first mortal endowed with prophetic powers, as the first person who practiced the medical art, and credited with the establishment of the worship of Bacchus in Greece. The legend of the manner in which he came into possession of his power of prophesying is an interesting one. In front of Melampus's house stood an oak tree, in which a snake had built its nest; but the servants having killed the mother snake, Melampus reverently

burned its body and reared the young ones. One day, as he slept, they cleaned his ears with their tongues, so that on his awaking he discovered that he could understand the language of birds, and that with their assistance he could foretell the future; and after having an interview with Apollo on the banks of the Alpheus, he became a most renowned soothsayer. Among his deeds were the bringing of the oxen of Iphiclus to Neleus, by which he gained from the latter his daughter, Pero, for Melampus's brother, Bias, and the curing of the madness which had seized the women of Argos. In return for this he received a third of the kingdom. See also NELEUS, Vol. XVII, p. 320.

MELANCHOLIA. See INSANITY, Vol. XIII, pp. 104-107.

MELANIIDÆ, a family of fresh-water gasteropods found in southern Asia and central North America. The shell is conical, with thick, dark epidermis. Their anatomy and development have not been studied carefully.

MELANITE. See MINERALOGY, Vol. XVI, p. 411.

MELBA, MADAME NELLIE, the stage name of MRS. NELLIE ARMSTRONG, a soprano soloist; born in Australia, May 19, 1865, the possessor of a beautiful voice of rare power. When six years old she sang ballads at a charitable concert. After studying under Madame Marchesi, in Paris, she made her stage *début* Oct. 15, 1887, in *Rigoletto*, at Brussels, achieving a popular triumph. She created the rôle of Elaine in the opera of that name, written for her by Bemberg. In 1894, 1895 and 1896 she sang in grand opera répertoire in the United States, repeating her European successes. She was most successful as Juliet and Ophelia.

MELEAGER. See ANTHOLOGY, Vol. II, pp. 103, 104.

MELEAGER, a mythological Greek hero; according to some accounts, a son of Ceneus, king of Calydon and Althæa, and according to others, a son of Ares and Althæa. He was one of the most famous of the Ætolian heroes of Calydon, and distinguished himself in throwing the javelin. On his return from the Argonautic expedition the fields of Calydon were laid waste by a monstrous boar, which Artemis had sent against the country as a punishment because Ceneus once neglected to offer up a sacrifice to the goddess. Meleager gathered a band of heroes. In the band was the fair maiden, Atalanta; but the heroes refused to hunt with her, until Meleager, who was in love with her, overcame their opposition. Atalanta gave the animal its first wound and Meleager finally slew it. He gave the hide to Atalanta, but the brothers of Althæa took it from her, and Meleager, in a rage, slew them. This act was indirectly the cause of his death, for it appears that when he was but seven days old the Fates announced to his mother that the boy would die as soon as the piece of wood then burning in the fire was consumed. Althæa, upon hearing this, extinguished the firebrand and hid it in a chest; but

when Meleager had slain her brothers she burned the stick and Meleager at once expired. Althæa, repenting of her act, hanged herself, and Cleopatra, Althæa's mother, died of grief. Meleager's sisters wept unceasingly until Artemis took pity upon them and changed them into guinea-hens. Ancient artists were fond of depicting Meleager and the Calydonian boar-hunt. A number of the ancient statues still remain, the best being those in the Berlin and Vatican museums.

MELEAGRIS. See GUINEA-FOWL, Vol. XI, p. 264; and TURKEY, Vol. XXIII, pp. 657, 658.

MELETEUS. See JEROME, Vol. XIII, p. 630; and CHRYSOSTOM, Vol. V, p. 755.

MELGAREJO, MARIA. See BOLIVIA, Vol. IV, p. 18.

MELICERTES, a son of Athamas and Ino. His father, by command of Juno, had married Nephele, by whom he became the father of Phrixus and Helle, but he was secretly in love with the mortal Ino, by whom he begot Learchus and Melicertes. Having thus incurred the rage of Juno, Athamas was overcome with madness and slew Learchus. Ino, seized with grief, threw herself with Melicertes into the sea, where both were changed into marine divinities, the former becoming Leucothea and the latter Palæmon. The body of Melicertes, according to the common tradition, was washed upon the shores of the Corinthian Isthmus, where it was found by his uncle, Sisyphus, who instituted the Isthmian games in honor of the deified Palæmon. On the island of Tenedos it is said that children were sacrificed to him, and the whole worship seems to have had something gloomy about it.

MELIKOFF or LORIS-MELIKOFF, MIKHAIL TARIELOWITCH TAINOFF, COUNT, a Russian general of Armenian descent; born at Lori, Jan. 1, 1826; received his education at the Lazareff Institute. At an early age he began his military career, joining the Hussars at St. Petersburg. At the time of the Crimean War he had attained to the rank of colonel, and commanded a light cavalry regiment. He was present at the capture of Kars, and was appointed commandant of that town, with the rank of general. He also took part in the military operations in the Caucasus, and after the peace he was sent, as governor, to Vladi-Kavkas, in Circassia, in 1860. Some years afterward he obtained an unlimited leave of absence on account of the state of his health. He visited France, resided for some time at Paris, went next to Germany, and was staying at Wiesbaden when the declaration of war by Russia against Turkey recalled him to active service. He was appointed adjutant-general to the Grand Duke Michael, the imperial lieutenant commanding-in-chief the army of the Caucasus. It was, in fact, General Loris-Melikoff who directed all the military operations in a country with which no one was more intimately acquainted than himself. To him was due the capture of Ardahan by the Russian troops, May 17, 1877. He was subsequently governor of Astrakhan and of Kharkhoff, where he distinguished himself in the former place by his measures against

the plague, and in the latter against the nihilists. After the attempt to wreck the imperial palace with dynamite, Feb. 17, 1880, Loris-Melikoff was placed in charge of an extraordinary commission for the regulation of the empire, with almost unlimited powers. He was Minister of the Interior (1880-81). He died in Nice, Dec. 24, 1888.

MELILOT, a common name of species of *Melilotus*, or sweet clover, of the family *Leguminosæ*. They are natives of the Old World, but are cultivated and have run wild in the United States. They are sweet-scented herbs, with small yellow or white flowers in slender racemes, pinnately three-foliolate leaves, and small globular wrinkled pods. More or less used as forage plants.

MÉLINE, FELIX JULES, a French statesman; born in Remiremont, May 20, 1838; studied law at Paris and became a court reporter. He was elected a member of the Commune, but did not accept the office. After the establishment of the republic he was elected to the Assembly (1872) and held his seat until his appointment to the position of under-secretary of the Ministry of the Interior, a post which he held for only one year. Subsequent to this he became a member of the tariff commission and distinguished himself by his defense of a high protective policy. In 1881 he was returned to the Assembly, holding his seat until appointed Minister of Agriculture in 1883. He resigned in 1885 and was again elected to the Assembly. He was elected president of the Chamber of Deputies to succeed Floquet and held the position till the end of the session. He was elected to the succeeding Assemblies, in which he kept up his struggle for a protective tariff, until called upon by President Faure, April 27, 1896, to form a new Cabinet.

MELIPHOGIDÆ. See HONEY-EATER, Vol. XII, p. 139.

MELL, PATRICK HUES, an American educator; born in Walthourville, Georgia, July 19, 1814; after receiving an elementary education he spent two years at Amherst, but left without graduating, and then taught for several years in Massachusetts, Connecticut and Georgia. He was ordained to the Baptist ministry in 1842, and in the same year was elected professor of ancient languages at Mercer University. In 1856 he was called to the same chair in the State University at Athens, and transferred in 1880 to the chair of metaphysics and ethics, which he held until his death. He was elected chancellor of the university in 1878. During the Civil War he was appointed colonel of a regiment in the Confederate service. He was the author of *Parliamentary Practice* and of several valued treatises and essays on religious subjects. He died in Athens, Georgia, Jan. 26, 1888.

MELODEON. See HARMONIUM, Vol. XI, pp. 183, 184.

MELODRAMA, the name originally applied to that kind of dramatic performance in which declamation is interrupted from time to time by instrumental music. The name, however, which first was applied to the opera by its inventor, Ottavio Rinuccini, has come to designate a romantic play, de-

pending mainly on sensational incidents, thrilling situations and an effective dénouement. Great sums are spent in the staging of such pieces, and the costumes, scenery and mechanical effects are often very striking.

MELODY. See MUSIC, Vol. XVII, p. 77.

MELPOMENE. See MUSES, Vol. XVII, p. 74.

MELROSE, a town of Middlesex County, eastern Massachusetts, nine miles N. of Boston, on the Boston and Maine railroad. It has manufactories of boots and shoes, furniture, silver-polish and sewing-machine needles. Its public library has over 11,000 volumes. Population 1890, 8,519; 1895, 11,965.

MELTING-POINT. The following are some of the most important melting-points, which may also be regarded as the freezing-points of the corresponding liquids:

	DEGREES, CENTIGRADE.	DEGREES, FAHRENHEIT.
Alcohol, pure.....	-130	-202
Hydrobromic acid.....	-120	-184
Strongest sulphuric acid.....	-116	-177
Sulphuretted hydrogen.....	-85	-121
Ammonia.....	-75	-103
Sulphurous acid.....	-75	-103
Chloride.....	-75	-103
Carbonic acid.....	-70	-94
Chloroform.....	-70	-94
Mercury.....	-39-38	-38-39
Olive and linseed oil.....	-20	-4
Bromide.....	-7-3	×19-86
Ice.....	0	-32
Glacial acetic acid.....	17	62-6
Phosphorus.....	44-2	111
Potassium.....	62-5	144-5
Sodium.....	95-6	204
Iodine.....	113	235
Sulphur.....	115	239
Lithium.....	180	356
Solder, about.....	180	356
Tin.....	228	442
Bismuth.....	267	513
Lead.....	334	633
Antimony.....	430	806
Zinc.....	450	842
Magnesium, about.....	750	1,382*
Bronze, about.....	900	1,652
Silver, about.....	1,000	1,832
Brass, about.....	1,015	2,860
Copper, about.....	1,100	2,012
Iron, white cast, about.....	1,100	2,012
Iron, gray cast, about.....	1,225	2,237
Gold, pure, about.....	1,250	2,282
Steel, about.....	1,350	2,462
Soft iron, about.....	1,550	2,822
Manganese, about.....	1,600	2,912
Platinum, about.....	1,800	3,272
Iridium, about.....	1,950	3,542
Osmium, about.....	2,500	4,532

* Melting-points beyond about 900° or 1,000° F. are merely approximate and relative.

MELVILLE, the name of an island, a sound and a peninsula in the polar regions of North America. The island is 200 miles long by 130 miles broad, and is situated between long. 105° and 117° W. It was discovered in 1819 by Captain Parry. Its surface is low and undulating. The sound, about 250 miles long by 200 broad, extends S.E. of the island and communicates with the Arctic Ocean and with Baffin Bay. The peninsula is separated from the sound and

island, being much farther to the southeast. It extends north-northeast from the mainland toward Cockburn Island, and separates the Gulf of Boothia and Fox Channel.

MELVILLE, GEORGE WALLACE, an American naval engineer; born in New York City, Jan. 10,



GEORGE W. MELVILLE.

1841; educated in his native city and entered the United States navy as third assistant engineer, with the rank of midshipman, in July, 1861. He passed through all the intermediate grades to that of engineer-in-chief of the United States navy, with the rank of commodore, which he attained in 1887. During the Civil War he volunteered for many desperate services. He was engineer of the *Jeannette*, which sailed on July 8, 1879, under the command of Lieutenant George W. De Long, on a polar expedition. Melville accompanied De Long over the ice to Bennett Island, after the sinking of the *Jeannette*, in June, 1881, and after the division of the party he commanded one of the *Jeannette's* boats, which reached the mouth of the Lena River in September of that year. Melville afterward discovered the remains of De Long and his eleven companions. In his position as engineer-in-chief he contributed largely to the building up of the new United States navy, the most remarkable of his designs being that of the triple-screw machinery for some of the swift cruisers. Besides this, he developed a plan for increasing the speed of ships by lengthening their smokestacks. He was the author of *Delta*, an account of the voyage of the *Jeannette*, and contributed the article on the NAVY OF THE UNITED STATES, in these Supplements.

MELVILLE, HERMAN, an American author; born in New York City, Aug. 1, 1819. In 1837 he went to sea as a common seaman, shipping for Liverpool, and several years later sailed around Cape Horn for a whaling-cruise in the South Pacific Ocean. But as the treatment to which he was subjected was harsh and forbidding, he, with a companion, deserted when the vessel reached one of the Marquesas Islands. Here the two mariners were held captive for several months. Altogether, Melville spent about two years among the islands of the Pacific Ocean. In 1850 he removed to Pittsfield, Massachusetts, but subsequently returned to New York City, where he became employed at the custom-house. His adventures formed the basis of his earliest work, *Typee* (1846), and were further related in *Omoo* (1847). In both books, novel adventure is apparently mingled with romance. Besides the two works mentioned, his writings include *Mardi* (1849); *White Jacket* (1850); *Moby Dick* (1851); *The Confidence-Man* (1857); *Battle-Pieces and Aspects of the War*, a volume of poems (1866); and *Clarel*, a poem (1876). He died in New York, Sept. 28, 1891.

MELVILLE, SIR JAMES, a Scotch courtier; born at Halhill, Fifeshire, in 1530; for some time page to Queen Mary of Scotland. In 1564 he was sent to the English court with friendly messages to Elizabeth concerning the approaching marriage with Darnley. Two years later he acted as interim secretary to the Scotch queen, and was an unwilling confidant of Darnley, who remarked to him about the murderers of Rizzio, "As they have brewed, so let them drink." The same year he was sent to announce the birth of James VI of Scotland to the court of England. In 1567 he remonstrated with Mary in connection with her marriage with Bothwell and received the answer that "matters were not that far agaitwart." He was afterward carried with her a captive to Dunbar, and negotiated the surrender of Edinburgh Castle. He was asked to undertake a mission to Denmark (1595) in connection with the proposed marriage of James VI to the younger daughter of the King, but he escaped from the duty. He received the last instructions of Queen Mary on the scaffold. He died Nov. 1, 1607.

MEMBRANE, a term in anatomy and physiology indicating any soft texture made up of tissues, as the membranes of the brain, mucous membranes, serous membranes, or the fetal membranes.

MEMMINGER, CHARLES GUSTAVUS, an American lawyer and publicist; born in Würtemberg, Germany, Jan. 9, 1803; removed to the United States when very young and settled in South Carolina, being, at the age of nine years, adopted by Governor Thomas Bennett. After graduating at South Carolina College, he studied law and began the practice of his profession at Charleston, being one of the leaders of the Union party during the nullification excitement. In 1836 he was elected to the legislature of his state, in which he sat until 1852. From February, 1861, until June, 1864, he was Secretary of the Treasury in the Confederate government. After his resignation he lived in retirement, and died in Charleston, March 7, 1888.

MEMNONIUM. See EGYPT, Vol. VII, p. 779.

MEMORY. See PSYCHOLOGY, Vol. XX, pp. 60-66.

MEMPHIS, a town and the capital of Scotland County, northeastern Missouri, 42 miles W. of Keokuk, Iowa, on the Keokuk and Western railroad. It is in a stock-raising and agricultural region, has several mills, and carriage and wagon, plow, stave, ax-handle and furniture factories. Some coal is mined. Dairy and farm products and stock are shipped largely. Population 1890, 1,780.

MEMPHIS, a city of Tennessee, situated on the Illinois Central, the Kansas City, Fort Scott and Memphis, the Louisville and Nashville, the St. Louis, Iron Mountain and Southern and several other railroads. It is in a region devoted mainly to raising cotton, corn, wheat, wool and live-stock. The city is growing in manufacturing activity. Cotton goods are the principal articles of manufacture, the Pioneer cotton-mills having 6,176 spindles, consuming over 1,000,000 pounds of cotton per annum. During the decade from 1880 to 1890 the manufacturing industries were doubled; in 1890, 345 reported to the Census Bureau; these had an aggregate

capital of over \$9,000,000, and produced over \$13,000,000 worth of merchandise that year. Memphis has about forty public and private schools, a Roman Catholic college, a city college for women, a state college for women, a city hospital and several orphan asylums. Since the yellow-fever calamity of 1878, the surrender of the old charter in 1879 and the reorganization of Memphis, sanitary reforms have been carried on with great persistence and thoroughness, till now it is one of the most healthful cities in the Mississippi Valley. Since 1880 over forty miles of sewers and even a greater length of subsoil drain-tiles have been laid. The city has a supply of water from Wolf River. The streets are lighted with electricity. Commercially, the town is advancing rapidly. In 1890 the business exceeded \$130,000,000. From 1880 to 1890 the city debt decreased from \$7,000,000 to \$3,000,000. Population 1880, 33,592; 1890, 64,495. See also MEMPHIS, Vol. XV, pp. 847, 848.

MEMPHREMAGOG, LAKE, a long, narrow body of water, extending from Vermont into Quebec in a curved line, but generally northward in direction. It is 35 miles long and between 2 and 5 miles wide. It is in a very picturesque region, generally heavily timbered, and it is studded with densely wooded islands. From the edge of the lake rises Mount Orford, 3,500 feet above its surface. It abounds in fish, and is popular as a summer resort.

MENABREA, LUIGI FEDERICO, MARQUIS VALDORA, an Italian statesman; born in Chambery, Savoy, Sept. 4, 1809; graduated as a C.E. and Ph.D. from the University of Turin; entered the engineer corps of the Sardinian army; appointed a professor of engineering in the Military Academy at Turin. Afterward he served in the Sardinian ministries of War and Foreign Affairs. In the war against Austria in 1859 he was chief of staff and conducted the siege of Gaeta. In 1861 he was made a Senator, a lieutenant-general and a count; in 1866 he signed for Italy the Austro-Prussian treaty of Prague, and in 1867 he was for two years president of the Council and Minister of Foreign Affairs. In 1875 he was created Marquis of Valdora, and in 1876 he served as ambassador to England, and as ambassador to France from 1882 to 1892. He was an accomplished mathematician and engineer, and published *Le Génie Italien dans la Campagne d'Ancone et de la Basse-Italie* (1866).

MENAI STRAIT. See ANGLESEA, Vol. II, p. 30.

ME-NAM. See SIAM, Vol. XXI, p. 850.

MENASHA, a city and railroad center of Winnebago County, southeastern central Wisconsin, 18 miles N. of Oshkosh, on the Wabash, the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It has abundant water-power, used in a number of manufactories, including a large chair factory, iron, wooden-ware, hub and spoke works, machine-shops, and paper, woolen and saw mills. Population 1890, 4,581; 1895, 6,154.

MENDENHALL, THOMAS CORWIN, an American scientist; born in Ohio, Oct. 4, 1841; received only a common-school education; became, in 1873, professor of physics and mechanics in Ohio University; professor of physics in the Imperial University

of Japan at Tokyo (1878); occupied himself principally with meteorological observations in Japan; and on his return in 1881 resumed his old position, directing, at the same time, the Ohio State Weather Service. In 1884 he became connected with the United States Signal Service, increasing materially the efficiency of the service by means of a new system of observations, especially relating to earthquakes, and in 1886 accepted the presidency of Rose Polytechnic Institute, Terre Haute, Indiana. From 1889 to 1894 he was superintendent of the United States Coast and Geodetic Survey; president of the Polytechnic Institute, Worcester, Massachusetts (1894); one of the two United States Commissioners to the Bering Sea Joint Commission in 1892, chairman of the United States Board of Geographic Names in 1890. He wrote *A Century of Electricity* (1887).

MENDES, a city and deity. See EGYPT, Vol. VII, pp. 717, 718.

MENDIBURU, MANUEL DE. See PERU, Vol. XVIII, p. 675.

MENDOCINO CAPE, the most western point of California, situated in Humboldt County, in lat. 40° 26' 24" N., long. 124° 23' 27" W. It is a lofty headland, on which is situated an iron lighthouse showing a white flash-light of the first order, 428 feet above sea-level.

MENDOTA, a city of Lasalle County, northeastern Illinois, 80 miles W. by S. of Chicago, on the Illinois Central and the Chicago, Burlington and Quincy railroads. It is in a corn and wheat raising and coal-mining region, and has important factories and foundries and machine-shops. It has Blackstone High School and Wartburg (Lutheran) Seminary and a public library. Population 1890, 3,542.

MENDOZA, HURTADO DE. See PERU, Vol. XVIII, p. 677.

MENDOZA, GARCIA (1535-1609). See ARGENTINE REPUBLIC, Vol. II, p. 489.

MENDOZA, INIGO LOPEZ. See SANTILLANA, Vol. XXI, p. 300.

MENDOZA, PEDRO DE. See ARGENTINE REPUBLIC, Vol. II, p. 489.

MENENDEZ DE AVILES, PEDRO, a Spanish sailor; born in Avilés, Asturias, Spain, in 1519. Attained the rank of captain-general of the Spanish navy, and possessed the confidence of Philip II; commanded the fleet that carried the King to England in 1554, when Philip married Queen Mary; was twice governor-general of the West Indies, but supposed irregularities connected with the fortune he secured caused him to be imprisoned for a short time in 1560. Having regained his political influence he sailed with a large fleet for Florida, to colonize the coast and drive out the Huguenot immigrants. By dint of horrible cruelties he succeeded in his task of exterminating the French colonists. He founded, Sept. 8, 1565, the fort and city of St. Augustine, the oldest European city in the United States. He also explored South Carolina and Chesapeake Bay and ascended the Potomac, mercilessly destroying part of the Indian villages. He returned to Europe in 1573 and received the command of a large fleet gathered by Philip II, to crush England and the Netherlands,

but before the day fixed for sailing he died at Santander, Sept. 17, 1574.

MENENDEZ Y PELAYO, MARCELINO, a Spanish author; born in Santander, Spain, 1857; graduated from the Madrid University and took a long post-graduate course at Barcelona and Paris. On his return to the capital, he was chosen professor of Spanish literature at the University, his extreme youth rendering a special government license a prerequisite to the appointment. When barely 24 years old he was elected a member of the Spanish Academy. He is counted among the old Conservative and ultra-Catholic writers of his country, although his style and his critical methods are quite modern. He shows decided antagonism toward Germanism in philosophical matters and great love for the literary masters of the Latin races. His defense of the Inquisition in his book *Historia de los Heterodoxos Españoles* (3 vols., 1880-82) excited the indignant ire of liberals, both in Spain and abroad. He is in his best vein in purely literary themes, which he treats with firm hand and acute judgment. Such are his *Estudios de Crítica Literaria* (1884); *Calderon y su Teatro* (1884); *Historia de las Ideas Estéticas en España* (5 vols., 1884-91). Poetry of excellent quality is found in his *Odas*, *Epístolas* y *Tragedias* (1883). He edited a superb collection of the works of Lope de Vega, and collected a most valuable *Antología de Poetas Líricos Castellanos* (4 vols., 1893) with excellent introductions. He also essayed a translation of Horace's *Odes*.

MENEPTAH or MENPTAH. See EGYPT, Vol. VII, pp. 739, 740.

MENES. See EGYPT, Vol. VII, p. 731.

MENKARA or MENKAURA. See EGYPT, Vol. VII, p. 772.

MENNONITES IN THE UNITED STATES, a religious body of which a general account is given in Vol. XVI, pp. 11, 12.

The Russian Mennonites, in 1871, were deprived of their immunity from military service, and prepared for emigration, large numbers coming to the United States, and settling in Kansas, Nebraska, Minnesota and the Dakotas. Considerable numbers also went to Canada, attracted by the liberal offers of the Dominion Parliament, and formed two settlements, one on the Rat River reservation and one on both banks of the Red River, in Manitoba, the two settlements numbering about ten thousand. The Mennonites are mostly agriculturists, frugal, thrifty and moral. They believe that the New Testament is the only rule of faith; deny original sin; condemn infant baptism; refuse to take official oaths; generally baptize believers by pouring water on their heads while kneeling; observe foot-washing; believe in close communion; and use the ban to punish unworthy members. Their pastors, for the most part, serve without pay, and in several branches the number of ministers is considerably greater than the number of churches, there being sometimes two or more pastors in one church. The pastors are elected by lot from the congregation. Deacons, who care for the poor and sick and take charge of the parish, are chosen the same way. Bishops or elders are elected to take charge of a district having several

congregations and ministers. The bishops, deacons and lay delegates form conferences for mutual aid and sympathy. Difficulties between members are settled by arbitration, those refusing to arbitrate being excommunicated. There are twelve branches of the body in the United States, the *Mennonite Church*; the *Amish* or followers of Jacob Amen, who separated over a dispute on church discipline and were often called "Hookers" because of their refusal to wear buttons on their clothing; the *Brüderhof Mennonites*, founded by Jacob Huter in 1536, and who are "communists"; the *Old Amish*, or strict adherents to ancient customs; the *Apostolic*, a branch of the Amish; the *Reformed Mennonites*, separatists under Jacob Herr in 1812; *General Conference Mennonites*, who originated in 1848 under John Oberholtzer, believe in an educated ministry and in worldly conformity, and who, in 1895, had 100 ministers, 5 churches and 6,000 members, and support an orphans' home at Bluffton, Ohio; *Church of God in Christ*, or "Quaker" Mennonites, who originated in 1859; *Old (Wisler) Mennonites*, originated in Elkhart County, Indiana, about 1870; *Bundes Konferenz der Brüder-gemeinde*, who originated in Russia, and are immersionists; *Defenseless Mennonites*, another branch of the Amish; and *Mennonite Brethren in Christ*, who originated about 1879, are Methodist in discipline, have open communion and optional forms of baptism. Their number about 4,000 communicants, sustain an orphans' home at Berlin, Ontario, and a foreign mission at Wuhu, China. In 1895 these 12 branches reported an aggregate of 950 ministers, 600 churches and 47,669 communicants. The largest were the Mennonite Church, with 18,378 members, and the Amish, with 10,700 members. A close affiliation exists between these two branches.

MENOMINEE, a city and the capital of Menominee County, the southernmost point of the northern peninsula of Michigan, 48 miles N.N.E. of Green Bay City, Wisconsin, on Green Bay, at the mouth of the Menominee River, the largest city of the northern peninsula. Its lumber-mills have a capacity of 275,000,000 feet per annum. Iron-mining, marble-quarrying and lumber-shipping are the chief industries. Population 1890, 10,630; 1894, 12,532.

MENOMONIE, a city and the capital of Dunn County, central western Wisconsin, 23 miles W. of Eau Claire, on Cedar River, and on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads. It is extensively engaged in the fur trade, has manufactories of iron, machinery, carriages, sashes and blinds, shingles and lumber, besides flour-mills and brickyards, and enjoys excellent educational facilities. Population 1890, 5,491; 1895, 6,198.

MENOMONIES INDIANS. See INDIANS, Vol. XII, p. 832.

MENOPOMA. See AMPHIBIA, Vol. I, p. 759.

MENSTRUATION. See REPRODUCTION, Vol. XX, p. 408.

MENTANA. See ITALY, Vol. XIII, p. 491.

MENU or MANU. See BRAHMANISM, Vol. IV, p. 206; and SANSKRIT, Vol. XXI, p. 288.

MENURA. See LYRE-BIRD, Vol. XV, pp. 115-117.
 MENZALEH OR MENZELEH LAKE. See EGYPT, Vol. VII, p. 709.

MENZEL, ADOLF FRIEDRICH ERDMAN, a German painter, lithographer, illustrator and engraver; born in Breslau, Silesia, Dec. 8, 1815; educated at the Berlin Art Academy, and by his father, a distinguished lithographer. He soon took an independent course, publishing, in 1838, his *Five Senses*, a series of original lithographs. He attempted painting in oils later in life, devoting himself to *genre* compositions, many of which proved highly popular. He is known also for his drawings and oil-paintings illustrative of the times of Frederick the Great and Emperor William I, pictures characterized by historical fidelity, strong realistic conception, originality and humor. His *Adam and Eve*; *Christ Among the Doctors*; and *Christ Expelling the Money-Changers*, are also notable pictures. In 1885 a special exhibition of his leading works was held in Paris. He was made a knight of the Legion of Honor in 1867, and a member of the Berlin Academy of Fine Arts (1853).

MERCANTILE AGENCY, an institution founded in the interest of manufacturers, merchants, bankers and others to furnish information as to the financial standing, business reputation and credit of individuals, firms and corporations engaged in mercantile or industrial enterprise.

Commerce proceeds on the lines of knowledge, and this is one of the principal reasons why commercial progress was so limited until the middle of the present century, for previous to that time comparatively little was known of the laws governing commercial transactions in distant countries, while reciprocal information between the various communities had not determined the measure of the responsibility of individuals. Commerce secured its increased development, not alone by reason of increased facilities, but because of the advancement of commercial credit throughout the civilized world. The modern mercantile agency, as the term is understood in the United States, was first established in New York City, about 1840, and from its inception has held a distinctive place as compared with similar organizations in other sections of the world, although embracing among its functions some of the work of the Scottish Trade Protection Societies, formed about the middle of the last century. Those organizations gathered and reported, for the protection of members, information respecting bankruptcies, insolvencies and the like, but they did not conceive the practicability of gathering data for the establishment of commercial credits. The vast and rapid increase of population, and the extension of the railroad, postal and telegraphic communication, brought new conditions and created the necessity for an organization to do promptly and systematically for many what had formerly been imperfectly done by the individual merchant or banker receiving or extending credit. The necessity for a system which would obtain local and general information as to the character and personal responsibility of individuals, firms or corporations, and make such information available in all business centers, became

apparent. It was under such conditions that the mercantile agency system was first conceived. At the outset many difficulties presented themselves, and many doubts were expressed as to the possibility of successfully dealing with subject matters so important and yet so delicate and personal. The unprecedented growth of cities, towns and villages over the widespread area of the North American continent rendered it more difficult to establish and maintain a satisfactory system than in other sections of the world, but the necessities for such a system were greater, for obvious reasons. Since its foundation it has been active in determining its resources, establishing its principles and demonstrating its ability to do well, in the general interests, what had previously been done by individual effort, and it has so fulfilled its obligations and justified the confidence placed in it that it is recognized as one of the important factors in the world of commerce. It acts as a clearing-house for information affecting mercantile affairs and mercantile credit. It procures and disseminates information so broadly as to enable the solvent merchant of any community to purchase his supplies in the most advantageous markets of the world. The element of time, always of prime importance, is also of great value, for credit must be, as a rule, promptly determined.

Every person entering into business engagements is weighed in the scale of public opinion; to accurately reflect that opinion without prejudice is the assumed duty of the agency. The information so collated estimates the character, ability and apparent success with which the undertaking is conducted, the capital invested, and such other information as may have a direct bearing or influence on credit. It is not *ex parte*, for opportunity is afforded every individual, firm or corporation to make statements as to their own financial condition. From the information so obtained and formulated is deduced what are known and recognized as "commercial ratings." The names of the various merchants, with the ratings, are issued quarterly, in book-form, and are classified, first by states and provinces, then by cities and towns, all arranged in alphabetical order. These volumes, covering the United States and Canada, embrace a million and a quarter of distinctive business organizations, and yet so simply are they classified that a reference can be had with as much readiness as the finding of a subject in an encyclopædia.

The service of the agency is primarily in the interests of the subscriber, who, for a moderate consideration, receives, upon application, information desired, and also the use, for a limited time, of the current printed volumes containing the names and ratings of those reported. The great agencies comprehend in their work the entire list of names of persons and business organizations known and recognized in the mercantile community, and to accomplish this they have established offices in all commercial centers throughout the continent. A manufacturer in a small city or town in the interior has every facility for learning the standing of all dealers in his particular line throughout the continent as readily as the merchant or banker of the

large city, while the credit of the local dealer is established in all the markets from which he could advantageously make his purchases, credit being as important to the seller as to the buyer. The merchant of the interior finds, through this system, his credit known in every city, while every distributor of merchandise finds it a simple, convenient and quick reference for ascertaining the standing of buyers, near or remote. The whole commercial world is practically embraced by these institutions. Their archives are a mine of valuable information, and contain the detailed history of millions of individuals, firms and corporations now or previously engaged in active business, besides hundreds of thousands of others who have an interest in or who may be more or less responsible for those who assume the direction of mercantile organization. Europe and America, Australia and the Orient are thus brought into close touch commercially, and have at their command, in convenient form, the result of these investigations.

To the worthy solvent dealer, in whatever section, the reports and ratings are practically "letters of credit," valuable to the extent of their means and ability; while to those who are irresponsible and unreliable the institution is like the law to evil-doers—a constant restraint.

C. F. CLARK.

MERCANTILE LAW, a branch of the law which pertains to the rights, duties and liabilities of those engaged in mercantile transactions. This branch of the law is also known as the law-merchant. It is made up mostly from rules and practices among merchants in their business dealings with each other, which have gradually developed from custom into law, and is founded upon principles of equity and justice which usage has established for convenience to regulate the dealings of merchants with each other. The rules have become of application, not alone to merchants, but to all who may be engaged in any mercantile transaction. There is no other branch of law in which so great uniformity prevails throughout the civilized world. This results, no doubt, from the greatly increased business intercourse which now exists between the different nations, which renders it exceedingly convenient, and almost necessary, that the rules of commercial transactions be practically the same throughout the world. In the various states of the United States many statutory rules are established, but in most cases they are merely formulations of rules already existing. Minor differences frequently occur, but the laws are essentially alike in principle. For the various principles of mercantile law, see the articles, in these Supplements, under title of the different classes of commercial property, relations and transactions.

MERCAPTANS, the organic sulphhydrates, or thio-alcohols, i.e., alcohols with oxygen replaced by sulphur. Their odors are, as a rule, very disagreeable and persistent. They are almost insoluble in water, and generally form salts, especially with mercury; hence the name. Ethyl mercaptan is used to make sulphonal and other soporifics.

MERCATOR'S PROJECTION. See MAP, Vol. XV, pp. 520, 521.

MERCED, a city and the capital of Merced County, central California, 120 miles E.S.E. of San Francisco, on the Bear Creek and the Southern Pacific railroad. It is in an irrigated agricultural and fruit-growing region, and has a large shipping-trade in wheat and other products. It has wagon-works, a foundry, planing-mills and a large fruit-cannery. Population 1890, 2,009.

MERCER, a post borough and the capital of Mercer County, northwestern Pennsylvania, 56 miles N. of Pittsburg, on the Pittsburg, Shenango and Lake Erie and the Western New York and Pennsylvania railroads. It is in a fertile farming section, devoted mostly to stock-raising. Coal is mined, and natural gas is abundant. It is one of the largest horse-markets of western Pennsylvania, and manufactures iron, flour, lumber, etc., Population 1890, 2,138.

MERCER, HUGH, a Scotch-American soldier; born in Aberdeen, Scotland, about 1720; graduated as a physician from Aberdeen University, and acted as surgeon in the Young Pretender's army in 1745. After Charles Stuart's defeat he went to America, and settled in Pennsylvania, entering the volunteer army and being wounded at the battle of Monongahela. In recognition of his services the corporation of Philadelphia awarded him a medal. In 1775 he drilled the Virginia militia, and was made colonel of the Third Virginia Regiment and brigadier-general (1776); under Washington he led a column of attack against Trenton, and commanded the advance forces in the night attack on Princeton; his troops, mostly raw militia, abandoned him to the fury of the British soldiery, who left him for dead on the field. He died a few days later (Jan. 12, 1777), in the enemy's hands, but attended by a special envoy sent to him by Washington under a flag of truce.

MERCER, JESSE, an American clergyman; born in Halifax County, North Carolina, Dec. 16, 1769. After an incomplete education he was ordained a Baptist minister at the age of 19. For fifty years he was a diligent preacher, and exerted a wide and powerful influence over the Baptist churches in Georgia, being elected 18 years in succession president of their convention. He was a wealthy man, and spent his money freely in behalf of his church. He founded and published the *Christian Index*, and after making it a success, presented it to the convention. In his will his donations amounted to \$60,000, a large portion of the amount going to Mercer University, named in his honor. He died in Washington, Georgia, Sept. 6, 1841.

MERCERSBURG, a post borough of Franklin County, central southern Pennsylvania, 15 miles S.W. of Chambersburg, on the Cumberland Valley railroad. It contains Mercersburg College and a theological seminary of the German Reformed Church, and was formerly the seat of Marshall College. Population 1890, 967.

MERCHANT TAYLORS' SCHOOL, an institution of learning founded in 1561 in the city of London, England, by Sir Thomas Whyte, founder of St. John's College, Oxford, and the Court of the Merchant Taylors' Company. It is still governed by the latter corporation; is a day-school of five

hundred pupils, established in its own building on Charterhouse Square; has in its gift 39 college scholarships, each from £86 to £100 for from 5 to 7 years; of these, 26 apply to Oxford and 9 to Cambridge.

MERCIA. See ENGLAND, Vol. VIII, pp. 270, 282.

MERCIÉ, MARIE JEAN ANTOINE, a French sculptor; born in Toulouse, France, Oct. 30, 1845; a pupil of Falguière and Joffroy; was awarded the first Prix de Rome by the Paris School of Fine Arts in 1868, exhibiting at the Salon the same year. During his stay at the French Art Academy in Rome (where winners of this prize spend four years, entirely at government expense), he exhibited a *David* (plaster) and a *Dalià* (bronze) which were greatly praised. His magnificent emblematic bronze group *Vae Victis* was the sensation of the Salon of 1874, and has been erected in one of the Parisian squares. He afterward produced a succession of admirable works which place him in the front rank of modern sculptors. He was elected a member of the Institute and a professor at the National School of Fine Arts, Paris. Among other noted works are *Le Génie des Arts* (for the Tuileries); *Gloria Victis*; *Junon Vaincue*; *Quand Même* (for the unconquered city of Belfort); *Victor Hugo* (bust); *Thiers* (statue); Bas-reliefs for the tombs of Arago and Michelet, etc.

MERCIER, HONORÉ, a Canadian journalist, lawyer and statesman; born in Quebec, Oct. 15, 1840; graduated from St. Mary's College, Montreal, and was called to the bar in 1867. He was elected to the Dominion Parliament in 1872-74; elected to the Quebec house of assembly in 1874; served as solicitor-general in 1879; re-elected to the assembly in 1881-86, and in the latter year became premier, serving until 1891, when the administration was dismissed by Lieutenant-Governor Angers for corruption, although it was claimed that Mercier was not personally implicated. He died in Montreal, Oct. 30, 1894.

MERCUR, JAMES, an American soldier and scientist; born in Towanda, Pennsylvania, Nov. 25, 1842; graduated from West Point in 1866, and appointed second lieutenant of engineers; became first lieutenant in 1867; captain in 1875; assistant engineer in the survey of the Northern and Northwestern lakes in 1866-67; assistant professor at West Point in 1867-72; assistant to General Newton in the removal of the obstructions at Hell Gate in 1876-81, and professor of civil and military engineering at West Point in 1884. He wrote *Elements of the Art of War* (1888); *Military Mines, Blasting and Demolitions* (1892); he revised and enlarged *Permanent Fortifications*, by Mahan (1887).

MERCURY, a planet. See ASTRONOMY, Vol. II, pp. 777-779; and in these Supplements.

MERCY, SISTERS OF, a sisterhood of the Roman Catholic Church, founded by Katherine Elizabeth McAuley, at Dublin, Ireland, in 1827. The organization grew out of an institution founded by Miss McAuley, with two other young ladies, for the relief of destitute women and orphans. It, however, gradually assumed a religious character, and the title

of Sisters of Mercy was chosen. For a number of years the Order of Mercy had no written rule, but in 1841 a rule similar to that of the Sisters of Presentation was adopted and received the approval of Pope Gregory XVI. Miss McAuley, who was appointed the first mother superior of the order, saw 43 convents of her congregation established before her death, a number which has now increased to more than 200, situated in Ireland, England, Scotland, Australia and the United States, being introduced into the last named-country by Bishop O'Connor of Pittsburg, in 1843. The sisters of the order, divided into two classes, choir and lay-religious, bind themselves by their vows to serve the sick, the poor and the ignorant. On matters of government each separate community is under the jurisdiction of the bishop of the diocese in which it is situated.

MEREDITH, GEORGE, an English philosophic novelist and poet; born in Hampshire, England, Feb. 12, 1828. He was

educated in Germany, with the design of pursuing law as a profession, but afterward abandoned it for literature. His literary career was begun by the issue of a volume of *Poems* (1851) and a burlesque prose work entitled *The Shaving of Shagpat* (1855), followed, in 1857, by *Fa-*



GEORGE MEREDITH.

rina, a legend of Cologne. With the publication, in 1859, of a tragic romance of much power, heightened by phenomenal skill in epigrammatic phrasing, *The Ordeal of Richard Feverel*, Mr. Meredith made his first demand upon the attention of thoughtful novel-readers. This was followed by *Evan Harrington* (1861), a social comedy which gave scope for the author's quaint humor. *Emilia in England* appeared in 1864, and its sequel, *Vittoria*, in 1866. These, again, were followed by works which placed him among the stimulative thinkers of the era. The chief of these are *Rhoda Fleming* (1865); *The Adventures of Harry Richmond* (1871); *Beauchamp's Career* (1875); *The Egoist* (1879); *The Tragic Comedians* (1881), a study of Ferdinand Lassalle, the German socialist (see Vol. XIV, pp. 320-322); *Diana of the Crossways* (1885), suggested by the life of Mrs. Caroline Norton (see Vol. XVII, p. 574); and *One of Our Conquerors* (1890). His later stories are *Lord Ormont and His Aminta* (1894) and *The Amazing Marriage* (1895). Besides these, he reissued, in the latter year, a short tale, *The Tale of Chloe*, together with some volumes of verse, *Poems and Lyrics of the Joy of the Earth* (1883); *Poems and Ballads of Tragic Life* (1887); *A Reading of Earth* (1889); and *The Empty Purse* (1892). His novels, though caviare to the multitude, and often placing a severe mental tax upon his intellectual clientele of readers, are worthy of study for their profound treatment of present-day problems in sociology and politics, for his inventive resource, his vivid descriptions of scenery, and his skill in

dissecting character, analyzing motive and laying bare the roots of human action. His diction is too recondite and his style too much elaborated for enjoyment, while the introductory prologues to his novels repel rather than attract the reader. A characterization of the author was published by Richard Le Gallienne in 1890, and an estimate of his work as a poet by William Watson (see *Excursions in Criticism*) in 1893.

MERGENTHALER LINOTYPE. See **LINOTYPE**, in these Supplements.

MERGER, in law, the absorption or extinguishment of a thing of lesser importance by one of greater extent, but without increasing the greater, yet destroying the lesser, thing. See also **NOVATION**, Vol. XVII, p. 604.

MERIDA, a town. See **VENEZUELA**, Vol. XXIV, pp. 139, 140.

MERIDEN, a city of Connecticut. In 1890 236 manufactories reported to the Census Bureau. These had a capital of \$14,000,000, and turned out \$12,000,000 worth of products. The Meriden Britannia Company employs over 1,500 hands and has an annual output valued at \$3,000,000. Other manufactories of Meriden include silver-plated ware, hardware, cutlery, steel pens, glassware, cabinet organs, malleable iron, iron and brass castings and machinery. It has three libraries, with 12,000 volumes, savings banks, and a trust and safe-deposit company. Population 1890, 21,652. See also **MERIDEN**, Vol. XVI, p. 37.

MERIDIAN, a city and the capital and a railroad junction of Lauderdale County, central eastern Mississippi, 87 miles E. of Jackson, on the Southern, the New Orleans and Northeastern and three other railroads, the second city in population in the state. It is in a cotton-growing region, and has two seminaries for girls, machine-shops, steam corn-mills, and manufactories of furniture, doors, sashes and blinds, plows, and cotton yarn, and two national banks with a capital of \$230,000. Population 1890, 10,624.

MERIDIAN, a village and the capital of Bosque County, eastern central Texas, 57 miles S. of Fort Worth, on the Gulf, Colorado and Santa Fé railroad. It is a shipping-point for grain, cotton, wool, live-stock and hides. Population 1890, 1,137.

MERIDIAN CIRCLE. See **TRANSIT CIRCLE**, Vol. XXIII, p. 515.

MERIDIONAL PARTS. See **NAVIGATION**, Vol. XVII, p. 255.

MERIVALE, JOHN HERMAN, an English scholar and translator; born in Exeter in 1779; graduated from St. John's College, Cambridge, and was called to the bar in 1805. He was a contributor to Bland's *Collections from the Greek Anthology* (1813), and among his published works is *Poems, Original and Translated* (1844). He was commissioner of bankruptcy from 1831 until his death, in 1844.—His son, CHARLES MERIVALE, a historian; born in London, March 8, 1808; graduated from St. John's College, Cambridge, in 1830, and was successively tutor and fellow there. Having taken orders he was appointed

preacher to the university, rector of Lawford, chaplain to the speaker of the House of Commons, and in 1869 dean of Ely. His historical works include *The Fall of the Roman Empire* (1853); *History of the Romans Under the Empire* (1850-62); *Conversion of the Northern Nations* (1865); and a *General History of Rome* (1875). He died in Ely, Dec. 27, 1893.—Another son, HERMAN MERIVALE, a statesman; born in 1806; graduated from Trinity College, Oxford, and called to the bar in 1832. He was appointed professor of political economy at Oxford in 1837; under-secretary for the colonies in 1848; and in 1860 under-secretary for India. He published *Lectures on Colonization and Colonies* (1841); *Historical Studies* (1865); and *Life of Sir Henry Lawrence* (1873). He died Feb. 9, 1874, in London.—His son, HERMAN CHARLES MERIVALE, dramatist; born in London, Jan. 27, 1839; graduated from Balliol College, Oxford, in 1861, and was called to the bar in 1864. He practiced his profession until 1874, when he turned his attention to literature. Among his plays are *All for Her* (1874); *Forget-Me-Not* (1879); *The Cynic* (1882); *Our Joan* (1885); and, in collaboration with his wife, *The Butler*, *The Don*, etc. He published, in 1883, *The White Pilgrim*, and *Other Poems*.

MERLE, a bird. See **OUSEL**, Vol. XVIII, p. 74.

MERLE, HUGUES, a French painter; born in St. Marcellin, France, March 1, 1823; a pupil of Léon Cogniet. As a painter of children, either in *genre* pictures or in groups, he ranked among the best modern artists. His *Beggar* (1861) is in the Luxembourg Palace Museum. Among his best examples owned in America are *A Mad Woman*; *Asking Alms*; *The Young Christian*; *A Girl with a Child in Her Arms*; *Group of a Mother and Her Children*; *The Scarlet Letter*; and *Chasing the Butterfly*. He died in Paris, March 15, 1881.

MERLIN, a bird. See **FALCON**, Vol. IX, p. 3.

MERLIN, AMBROSIOUS. See **ARTHUR**, Vol. II, p. 650.

MEROBAUDES, FLAVIUS. See **RUTILIUS**, Vol. XXI, p. 113.

MEROM, a village of Sullivan County, southwestern Indiana, picturesquely situated on bluffs, on the Wabash River, two hundred feet high. It has a station on the Indiana and Illinois Southern railroad. It is the seat of Union Christian College, founded in 1859, which in 1896 had 13 instructors, 226 students and a library of 3,400 volumes. Population 1890, 412.

MEROPEDÆ. See **BEE-EATER**, in these Supplements.

MEROSTOMATA. See **CRUSTACEA**, Vol. VI, p. 662.

MEROVINGIAN. See **FRANCE**, Vol. IX, p. 528.

MERRIAM, AUGUSTUS CHAPMAN, an American Greek scholar and educator; born in Locust Grove, New York, May 30, 1843; graduated at Columbia, where he afterward was professor of Greek archæology and epigraphy. In 1887-88 he was at the head of the American School of Classical Studies at Athens, and the excavations superintended by him determined the birthplace of Thespis, the

father of Greek tragedy. He was elected president of the New York Society of the Archæological Institute (1890). Among his publications are *The Phæacians of Homer* (1880); *The Greek and Latin Inscriptions on the Obelisk Crab in the Metropolitan Museum, New York* (1883); and translated, with commentaries, *The Sixth and Seventh Books of Herodotus* (1885).

MERRIAM, CLINTON HART, an American naturalist; born in New York City, Dec. 5, 1855; graduated from the Sheffield Scientific School (Yale). He was naturalist of the Hayden Survey in 1872; assistant United States Fish Commissioner in 1875; in charge of the division of ornithology and mammalogy in the Department of Agriculture in 1886; and one of the Bering Sea commissioners in 1891 to 1892. His studies of American mammals, their nomenclature, distribution and habits, have been exhaustive and of great value. Among the most important of his many monographs are *Birds of Connecticut* (1877); *Mammals of the Adirondacks* (1884); *Geographic Distribution of Life in North America* (1892).

MERRILL, a city and the capital of Lincoln County, northern central Wisconsin, on the Wisconsin River, 17 miles above Wausau, and on the Chicago, Milwaukee and St. Paul railroad. There is a lumber-boom here with a capacity of 100,000,000 feet of logs. Lumber, lath and shingles are shipped in large quantities. Hardwood timber is abundant. It has good schools, a public library containing 5,000 volumes, and two national banks. Population 1890, 6,809; 1895, 8,607.

MERRILL, GEORGE PERKINS, an American geologist; born in Auburn, Maine, May 30, 1854; graduated from the Wesleyan University, Middletown, Connecticut. He was curator of geology at the National Museum, Washington, District of Columbia, in 1880, and afterward professor of geology and mineralogy at the Columbian University (Corcoran Scientific School). He wrote *Stones for Building and Decoration* (1891); and *Handbook for the Department of Geology, United States National Museum* (1890).

MERRILL, SELAH, an American clergyman, traveler and Orientalist; born May 2, 1837, in Canton Center, Connecticut; passed through Yale and the New Haven Theological Seminary. He was ordained an evangelist in 1864; and was chaplain of the Forthyninth United States Infantry (colored) at Vicksburg, Mississippi; studied in Germany (1868-70); made archæological researches in Palestine (1874-77); was United States consul at Jerusalem (1882-86), during which period he located the site of Calvary. He brought back from the Holy Land interesting collections of antiquities, birds, animals and plants. His narrative, *East of the Jordan* (1881), was widely read, as was his *Galilee in the Time of Christ* (1881). His consular reports and his contributions to archæological periodicals contain matter of high value concerning the state of Palestine in the days of Christ and at the present time.

MERRIMAC, a town of Essex County, north-

eastern Massachusetts, 13 miles N.E. of Lawrence, on the Merrimack River, and on the Boston and Maine railroad. Its principal manufactures are carriages and felt boots. It has a public library, and is connected with several neighboring towns by electric railway. Population 1890, 2,633; 1895, 2,301.

MERRIMACK RIVER, a stream of New Hampshire and Massachusetts, formed in northern Merrimack County, New Hampshire, by the confluence of the Pemigewasset and Winnipisseogee at Franklin. It flows south past Concord, New Hampshire, into Massachusetts, where it turns northeast and flows to the Atlantic, which it reaches in lat. 42° 48' 27" N. It is navigable as far as Haverhill, 15 miles, but it is prevented from being very serviceable in commerce by sand-bars at its mouth. It has several important fisheries, but is chiefly of importance for the water-power which it affords.

MERRIMAN, HENRY SETON. See SCOTT, H. S., in these Supplements.

MERRIMAN, MANSFIELD, an American civil engineer; born in Southington, Connecticut, March 27, 1848; graduated from Yale in 1871, and received from Sheffield Scientific School his C.E. degree in 1872 and his Ph.D. in 1876. He was instructor in the same school (1875-78); professor of civil and mechanical engineering there (1878-81); professor of civil engineering at Lehigh University, 1881; and was in charge of the triangulation of Pennsylvania for the United States Coast and Geodetic Survey (1880-85). He wrote *Continuous Bridges* (1876); *The Figure of the Earth* (1881); *The Mechanics of Materials* (1885); *A Text-Book on Roofs and Bridges* (1888); *Treatise on Hydraulics* (1889); *A Text-Book on Retaining-Walls and Masonry Dams* (1892); and *Introduction to Geodetic Surveying* (1892).

MERRITT, WESLEY, an American soldier; born in New York City, June 16, 1836; graduated at West Point in 1860, and entered the army as brevet second lieutenant of dragoons. He was appointed captain in the Second Cavalry in 1862; accompanied General Stoneman's raid to Richmond in 1863, and was appointed brigadier-general of volunteers thereafter. He was brevetted major after his bravery at the battle of Gettysburg, where he commanded the reserve cavalry brigade with distinguished gallantry, and continued in command of that brigade in subsequent operations up to April, 1864. For bravery at the battles of Yellow Tavern, Hawes's Shop and Winchester, he was brevetted, successively, lieutenant-colonel, colonel and major-general of volunteers. During the Shenandoah campaign, he fought gallantly in command of a cavalry division in the battles of



GENERAL W. MERRITT.

Opequan, Cedar Creek, Winchester, and Fisher's Hill, for which he was brevetted major-general; he distinguished himself also at Five Forks, Sailor's Creek, and at the final surrender, after which he was promoted to major-general, to date from Five Forks; and was brevetted brigadier and major-general, March, 1865. After the war he was kept on frontier duty until 1882, when he was placed in command of the United States Military Academy at West Point; was made lieutenant-colonel in 1866; colonel in 1876; brigadier-general in 1887; commander of the Department of the Missouri in 1895, and later of the Department of the East.

MERSEY, a river of England, formed in the northern part of Derbyshire, by the union of the Goyt and the Etherow. It flows west, expanding into the broad estuary at Runcorn, on which Liverpool is situated. This estuary is about sixteen miles long and three wide, and empties into the Irish Sea through Liverpool Bay. A tunnel from Liverpool to Birkenhead has been made under the river, and was put into operation in 1886. In 1895, the sand-bank in the mouth of the river was effectually removed, and vessels drawing 23 feet can enter the river in low water. See CANAL, and MANCHESTER, in these Supplements.

MERSINA, port of Tarsus. See CILICIA, Vol. V, p. 777.

MERSON, LUC OLIVIER, a French painter; born in Paris, May 21, 1846; a pupil of Pils and the National School of Fine Arts, where he was awarded the grand prix de Rome in 1869; he devoted himself to historical and religious painting; was awarded a first medal at the Salon of 1875, a gold medal at the Paris Exposition of 1889, and was made a member of the Institute in 1892. Among his noted canvases are *Apollon Exterminateur* (1869); *St. Edmund of England, King-Martyr* (1872); *Le Sacrifice à la Patrie, St. Michel*, model for a Gobelins tapestry (1875); *St. François d'Assise Prêche aux Poissons* (1881); *Le Jugement de Paris*; *L'Arrivée à Bethléem* (1885); *L'Annonciation* (1892). His drawings have been much admired; nine of them appeared in *Harper's Magazine* in 1892.

MESABI RANGE. See IRON AND STEEL, in these Supplements.

MESCAL, an intoxicating liquor, with some remarkable effects, obtained from a small species of spineless cactus (*Lophophora Williamsii*) growing along the Mexican border of Texas and in adjacent Mexico. The plant has the form of a small turnip. The top, being cut off and dried, shrivels into a button-shaped mass, and is known and sold as a "mescal button." These mescal buttons are used extensively in the religious ceremonies of the natives, who chew them and thus bring about certain curious psychological effects. In consequence of this use, the mescal-plant is regarded as sacred by the natives.

MESENTERY. See DIGESTIVE ORGANS, Vol. VII, p. 226.

MESHA, KING. See MOAB, Vol. XVI, pp. 534, 535.

MESMER, FRIEDRICH ANTON. See MAGNETISM, ANIMAL, Vol. XV, pp. 277, 278.

MESOZOIC PERIOD. See GEOLOGY, Vol. X, pp. 352-360.

MESQUIT GRASS, a name often given to certain species of *Bouteloua*, valuable pasture grasses of the Southwest. The other species of the genus are often called grama grasses.

MESQUIT TREE, the *Prosopis juliflora*, a spiny shrub or tree of Texas, belonging to the *Leguminosæ*. It is the chief woody plant of the wooded table-lands and high valleys, often forming impenetrable thickets. It is exceedingly useful for fuel, for a gum it yields, and also as an article of food, the ripe bean, called screw-bean, being one of the staple foods of Mexicans, Indians and grazing animals.

MESSALINA. See CLAUDIUS, Vol. V, p. 817.

MESSAPIAN LANGUAGE. See LATIN LANGUAGE, Vol. XIV, p. 327.

MESSINA, STRAIT OF. See SICILY, Vol. XXII, p. 29; MEDITERRANEAN, Vol. XV, p. 822.

MESTIZO, the name given in Mexico and South America to the offspring of a white father and an Indian mother. The white characteristics generally predominate. A brown Mestizo is the offspring of an Indian father and a quarteroon or quinteroon mother; a Mestizo-claro, of an Indian father and a Mestizo mother.

META. See ORINOCO, Vol. XVII, p. 844.

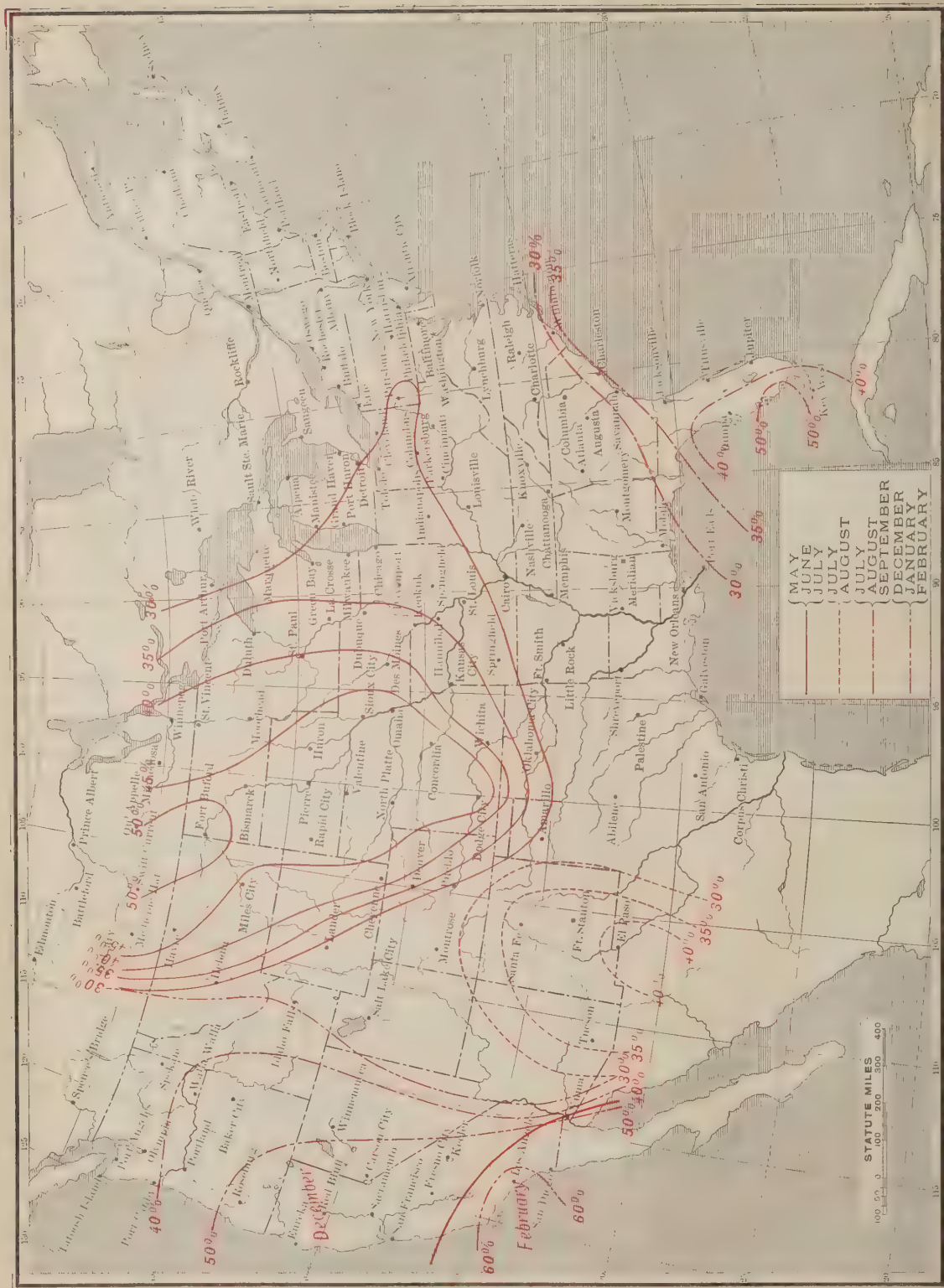
METABOLISM, in botany, refers to all chemical changes which occur in a living plant. These changes are either those by which more complex substances are made from simpler ones,—a process known as *constructive metabolism* or *anabolism*; or those by which simpler substances are derived from more complex ones,—a process known as *destructive metabolism* or *catabolism*. The most characteristic anabolic process in plants, as distinguished from animals, is that by which green tissue is able, under the influence of light, to construct organic substance from absorbed carbon-dioxide and water (see, under PHOTOSYNTHESIS, in these Supplements). The constructive or anabolic process reaches its highest expression in the living substance *protoplasm*. Catabolism or destructive metabolism includes the breaking down of protoplasm itself and of other complex substances. This breaking down is usually associated with the absorption of oxygen and the evolution of carbon-dioxide. These processes affect, also, the state of energy in the plant, anabolism being accompanied by the conversion of kinetic into potential energy, and catabolism by the conversion of potential into kinetic energy. See also PHYSIOLOGY, Vol. XIX, pp. 49-55; and ANABOLISM, in these Supplements.

METABOLISM, in animals. See NUTRITION, Vol. XVII, pp. 678-682.

METAGONY. See HEREDITY, in these Supplements.

METAMERISM. In zoölogy, see MOLLUSCA, Vol. XVI, pp. 672, 673. In chemistry, see CHEMISTRY, Vol. V, p. 551.

METAMORPHIC ROCKS. See GEOLOGY, Vol. X, pp. 314-317.



RAINY SEASONS OF THE UNITED STATES.



ANNUAL RAINFALL OF THE UNITED STATES.

METAMORPHOSCOPE, a toy mechanism for combining portions of figures in a grotesque fashion. It consists of three or more bands upon which figures, as of persons or animals, are pictured in such manner that the heads are on the upper band, the bodies on the next band, and the legs and feet on the lower bands. By shifting the bands so that the wrong bodies, legs, etc., are connected with the heads, the figures are metamorphosed with more or less amusing effects.

METAPHOR. See **RHETORIC**, Vol. XX, p. 513.

METATHERIA. See **MAMMALIA**, Vol. XV, pp. 371, 372.

METAYAGE, land tenure system. See **AGRICULTURE**, Vol. I, pp. 414-416.

METAZOA. See **ANIMAL KINGDOM**, Vol. II, pp. 51-54.

METEOROGRAPH, an instrument for making records of meteorological phenomena. It has a recording cylinder bearing a roll of paper and a clockwork mechanism which gives a quarter-hour record of the condition of the thermometer, barometer, direction and mean force of the wind, degree of humidity and atmospheric pressure. The power is furnished by a small electric motor.

METEOROLOGY. To the excellent article by Dr. A. Buchan on **METEOROLOGY**, in this work (see Vol. XVI, pp. 114-159), there may properly be added two matters of especial interest to Americans; viz., an account of the United States Weather Bureau and a discussion of the rainfall of the United States.

1. The American Weather Bureau is the most notable in the world in the extent of area which it endeavors to cover, in the magnitude of its annual expenditures and in the accuracy and amount of detail of the work which it accomplishes. The interest in general meteorological problems in the United States began early. Franklin was apparently the first to call attention to the important fact that the northeasterly storms of the Northern states came from the west. This was the first intimation, at least in this country, that storm areas drifted eastward,—a fact of so fundamental importance that the possibility of a system of weather-forecasting depends on it. Not long after (1772-77), Thomas Jefferson undertook simultaneous meteorological observations in conjunction with Bishop Madison, cousin of President Madison. The stations employed were Monticello and Williamsburg, both in Virginia, and about 120 miles apart. It is the use of simultaneous observations that makes the weather-map possible, and thus we have the second fundamental requirement of a weather service. The third is the speedy collection of observations, and this was afforded by the telegraph invented by Morse in 1837.

With the extension of telegraph lines over the United States came at once the idea of a weather service. Commodore Maury proposed the collection and charting of the observations in the early fifties, and traveled over the United States

canvassing the idea. About the same time Professor Henry, the first secretary of the Smithsonian Institution, put the idea in operation by means of a map with movable symbols. Such a map was put up in the halls of Congress and attracted much interest and attention, but the work was discontinued in 1861, at the beginning of the late Civil War.

In 1869 the idea was revived and put into practical operation by Professor Cleveland Abbe, then director of the Cincinnati Observatory, and successor of the late Gen. O. M. Mitchell. The data were collected by the Western Union Telegraph Company, free of charge, and the enterprise was fostered by the Cincinnati Board of Trade. Professor Abbe drew the maps, and copies of them were struck off in the local office of the telegraph company, and the work was continued for several months.

Great interest was taken in this enterprise by boards of trade and by scientific men, and in the session of Congress following, Hon. H. E. Paine, at the urgent request of Prof. I. A. Lapham of Milwaukee, introduced a joint resolution, which was passed by Congress, requiring the Secretary of War to have meteorological observations taken and storm-warnings issued for the Great Lakes and the Atlantic seaboard. This duty was placed by the Secretary of War in the energetic hands of General Myer, then chief signal-officer. The first weather-bulletin was issued Nov. 1, 1870, the first storm-warning a week later, and the first weather-map on Jan. 1, 1871. This was not the first governmental weather service, as Admiral Fitzroy inaugurated, in 1861, the British system of weather charts and forecasts, and on Sept. 16, 1863, Leverrier, at Paris, began the series of French weather-maps, the publication of which has been continued since without interruption. The American governmental service is, of the score or so now existing, third in order of commencement, but if we take into consideration Maury's proposal and Henry's maps, it may fairly be claimed that the credit of beginning this noteworthy movement and of proving its practicability belongs with the United States.

Gen. A. J. Myer remained in charge of the weather service until his death on Aug. 24, 1880. His administration was characterized by energy and success, and the forecasts made under his direction had a high degree of popular approval. It was to him that was given the title of "Old Probs," because, with the caution necessary at the beginning of such an enterprise, the early forecasts were issued as probabilities.

Gen. W. B. Hazen succeeded General Myer, and continued in charge until his death, Jan. 16, 1887. His administration was characterized by interest in the growth and development of the science of meteorology. He was succeeded by Gen. (then Captain) A. W. Greely, who remained in charge until July 1, 1891, when the meteorological duties of the Signal Service were handed over to the Weather Bureau, a new bureau created by Congress for the purpose, and placed

under the control of the Secretary of Agriculture. The first chief of the new bureau was Mark W. Harrington, previously director of the astronomical observatory at Ann Arbor, and founder and editor of the *American Meteorological Journal*. On July 1, 1895, he was succeeded by Willis L. Moore, an evolution of the bureau itself, as he had passed through all its grades.

The duties of the meteorological service had gradually been extended until at the time of the transfer it was put in charge of storm, weather and flood warnings, for the benefit of agriculture and navigation, the collection and transmission of climatic and weather information and the compilation and publication of climatic data. The resolution which established it, in 1870, carried an appropriation of \$15,000. The next year the appropriation was \$102,450, and from year to year it gradually increased, until under General Hazen the annual expenditure was about a million dollars. Under his successor it was decreased to an annual average of \$900,000, and under the Weather Bureau to about \$850,000. Meantime, the extent of its operations had gradually been increased until, in 1895, there were about 125 telegraphic reporting-stations, 30 exchange-stations with other countries, 2,500 voluntary observers reporting to 42 (1893) state weather services, and upward of 200 river and flood reporting stations. There were also about 160 stations showing storm-signals, between 1,600 and 1,700 showing weather and temperature signals, and about 500 for frosts. Nearly 100 stations make forecasts, and the most of them issue weather-maps. The publications of the bureau are numerous and of varied character. Of weather-maps alone about 2,500,000 are issued annually.

The chief work of the bureau lies in the collection of observations, the making of the forecasts, their distribution, and the preparation and distribution of climatic data. The observations are of several kinds, but the most important are those taken simultaneously twice a day for use in the preparation of the weather-map and its resulting forecasts. The hours used are eight a.m. and eight p.m., 75th meridian time, or five o'clock, Pacific time. At that hour, at each of the telegraphic stations, the observer takes the series of observations required of him, and, in fixed order, reduces them to a cipher used by the bureau, and hands them in at the nearest telegraph station, whence they go, in their proper order, to the central station at Washington City. Here they are taken in charge by the forecast official of the day, who, with the assistance of a force of clerks, uses them for the preparation of the weather-map. The forecasts then are deduced and dictated to a clerk, and the map and forecasts sent at once to the printing-office, where they are struck off with all practicable speed. Meantime, the forecasts are handed over to the great news-gathering agencies, by which they are distributed to the daily newspapers throughout the country. A similar process takes place simultaneously, but

on a smaller scale, at all the principal stations outside of Washington; and, within three or four hours after the observations have been taken, the forecasts have been made, and these, with the printed weather-maps, have been scattered broadcast over the country.

The forecasts are made, in each case, for the following day. Those from the morning observations are printed in the evening papers, and are for the next day; those from the evening observations are printed in the morning papers, and are for the day on which the paper appears. The advantage lies with the latter, and they should be more accurate than the former. It is sometimes practicable to forecast for a longer time ahead, especially in the South; but this is not encouraged, for the risk of failure increases very rapidly when the forecast is for more than twenty-four or thirty-six hours. The forecasts depend on the general shift easterly of the weather existing at any moment over the United States. This shift is at about the speed of an express train, but is subject to innumerable fluctuations in speed and direction, and the weather conditions, in advancing, may change in intensity or assume new features. The skill of the forecaster lies in foreseeing these fluctuations, and, for this, long experience, as well as a sort of intuitive tact, is necessary. The cyclones advance more uniformly than do anticyclones; and the former, when coming in view west of meridian 90° , usually direct their course toward the Great Lakes, while the latter are more likely to move toward the middle Atlantic coast. Great learning in meteorology does not necessarily enable a man to make high-class forecasts, and of late years as good records have been made by novices as by men of fifteen or twenty years' experience. A fair estimate of the verification of forecasts is probably 90 per cent, or nine successful forecasts out of ten; but the official verifications do not give so high a percentage—due to the inflexible arithmetical rules which the verifier must follow. So imperfectly do these rules fit the case, that ambitious forecasters sometimes are accused of predicting for record rather than for the public. Successful prediction is most difficult along the northern boundary of the States, due both to the higher degree of variability of the weather there and to the fact that most storms enter along this boundary. It is easiest on the southern boundary, because the weather there is most settled. Moreover, the storms which enter on the southern boundary are relatively rare, and are often intense. The more intense the storm, the easier it is to foresee its progress.

The distribution of forecasts, when made, presents many difficulties. That large part of the population which reads the daily papers soon after issue is informed from day to day as to approaching weather, and the additional fraction of the population which is within sight of the weather-signals, and understands them, can also be reached. But there is another large part of the population—those at sea and those in rural dis-

tricts—who cannot yet be reached except imperfectly and spasmodically. When a destructive change of weather is imminent, especial pains are taken to telegraph, and otherwise distribute by means of all available channels, warnings of danger, and at such times public interest is aroused and aids the distribution. Ordinarily, the farmer and ranchman cannot be reached, and there seems to be no prospect that he will be reached regularly until the telephone system is extended throughout the country.

Though the forecasts still are lacking in precision and detail, and their distribution is still imperfect, yet, in the service they render, they are worth probably ten or twenty times as much as they cost. Improvement must now come chiefly in increased accuracy in the forecasts themselves, and in more of detail in their statement. The art so far has depended chiefly on empirical methods, and advance in this direction seems to be about exhausted. Further progress can hardly be expected, except by improvements in the theory of meteorology. The science is one of those general terrestrial ones, like geography or geology, which cover so broad a field that governmental aid is needed for their growth. This is especially true of meteorology, when government already has occupied so completely the field that private enterprise languishes. There are two directions of advance which give especial promise of useful results. The first lies in the study of the phenomena of the condensation of moisture in the air into raindrops and other forms. The best judges are of the opinion that in this process lie the secrets of such intense storms as tornadoes. The investigation of this process was begun some years ago by the Weather Bureau, but a change of administration promptly put an end to it. The other promising line of research lies in the investigation of the meteorological processes taking place in the free air, especially in the cloud-layer. An investigation of the free air can be carried on by balloons, towers and kites, and the latter in 1896 had developed unexpected capacity for usefulness.

2. *Rainfall.* The work of the Weather Bureau in the compilation of climatic data is illustrated by the rainfall-maps issued in 1894, the result of a study of all the available observations made in the United States. The results are of great interest, and two of the maps of most importance are given herewith.

The mean annual rainfall over the United States (except Alaska) is given on the first chart. This map shows many details, which each reader may be left to find for himself. It will suffice here to point out that the heaviest rainfall in the United States is in the extreme Northwest and Southeast, and also at the southern extremity of the Appalachian range of mountains and about Cape Hatteras. The area of lightest rainfall is defined by an isohyetal of five inches, and is in the Southwest. This arid region is the extension of a Mexican one, and changes its extent and form greatly from month to month. The

greatest mean annual rainfall known in the United States is over 100 inches. The least is less than five.

The quantity of rainfall is not the only element that decides the agricultural possibility of an area. The time and character of fall are also of importance. If the rain descends in torrents or cloudbursts, it flows off with little penetration of the soil, and, moreover, by carrying the soil with it, is likely to cause injurious washes. Where it falls gently, its penetrating power is greater, the run-off is relatively less, and its action on animal and plant life more favorable. The gentlest rainfalls in the United States are found in the Northeast (especially about the eastern end of Lake Ontario) and in the Northwest, west of the Cascade Range of mountains.

Of still more importance is the season at which the most rain falls, for a light rainfall may be sufficient if it comes at the period of growing crops, and a heavy rainfall insufficient if at other seasons, and injurious if at the time of harvest. The second chart gives the areas where there is a marked fluctuation of rain with the season at which the maximum occurs. It appears from this that there are four distinct areas in the United States with marked rainy seasons. These are, the northern plains, with a late spring and early summer rainfall; Arizona and New Mexico, with a late summer rainfall; Florida, with a late summer and early autumn rainfall; and the Pacific Coast, with a winter rainfall, extending into the spring in the North.

MARK W. HARRINGTON.

METERS, measures of quantity or force. See GAS-LIGHTING, Vol. X, pp. 96, 97; and HYDROMECHANICS, Vol. XII, pp. 506-509.

METHODIST CHURCHES IN THE UNITED STATES. For a general account of Methodism, see Vol. XVI, p. 191.

THE METHODIST EPISCOPAL CHURCH is the oldest and largest Methodist church in the United States. From 1766, when the first society was formed in New York City, to 1773, when the first conference was held in Philadelphia, the churches were scattered organizations in New York, Pennsylvania, Virginia and other states; and the preachers were itinerants, nearly all of English descent. In July, 1773, ten preachers, representing 1,160 members, met in conference in Philadelphia. The Revolutionary War interfered greatly with the peace and development of the church. Dec. 24, 1784, sixty itinerant preachers met in conference and formed themselves into an independent organization, which they called the Methodist Episcopal Church. The conference adopted a Sunday service, articles of faith and an episcopal form of government. The second conference thus organized was held in 1792, in which the discipline was revised, regular conferences ordered, to meet every four years, and provision made for the election of bishops and the appointment of presiding elders.

In the conferences which followed, the structure of the church was gradually modified to meet

changed conditions, but its characteristic features were quite well defined before the beginning of the nineteenth century. The territory of the United States has been divided into annual conferences, and benevolent societies, educational institutions, Sunday schools and a publishing-house have been established. The official records furnish instructive facts concerning the growth of this church for the past one hundred years. In 1796 there were 293 preachers and 56,664 members. At the beginning of 1896 there were 140 annual organizations; 31,922 ministers and local preachers; 2,766,656 members and probationers; 30,264 Sunday schools, having 344,844 officers and teachers, and 2,580,973 scholars; 25,384 church edifices, valued at \$107,972,088, and 9,813 parsonages, valued at \$16,649,392. For benevolent society purposes there was contributed, in 1895, \$2,105,020; for ministerial support, \$10,385,948; for buildings and improvements, \$4,379,307; and for current expenses, \$3,680,698. (Compare the amount expended for ministerial support in 1895, with the official record that in 1800 the General Conference increased the salary of preachers to \$80.) The number of theological institutions, colleges and universities, classical seminaries, foreign mission schools, Bible training-schools, etc., in 1895, controlled wholly or in part by this church, was 219, the value of whose grounds and buildings was \$14,644,525, the number of professors and teachers 2,792, and the number of students 43,320.

The highest authority in the Methodist Episcopal Church is the legislative body known as the *General Conference*, its members being ministerial and lay delegates from the annual conferences. It is presided over by the bishops, acts as a court of final appeal, elects bishops, editors of church periodicals, book agents, and other officers connected with missionary and educational work. The *Judicial Conference* tries bishops and hears appeals of members convicted in an annual conference. *Annual Conferences* are administrative in their functions, and may be presided over by a bishop. *District Conferences* have the care of the benevolent, educational and financial interests of their respective districts. Their membership consists of a presiding elder, pastors, and one steward and Sunday school superintendent from each charge in the district.

The highest officers of the church are the bishops, who, collectively, are called the Episcopal Board. Since its organization the church has had 46 bishops; the board in 1896 numbered 18. The bishops not only preside over annual and general conferences, but they also divide the territory into districts, station the pastors, ordain deacons, elders and newly elected bishops. They have the general supervision of the affairs of the church, both temporal and spiritual. The function of a bishop is not restricted to the district to which he is assigned by the General Conference, but he has joint jurisdiction over the entire church. They hold office for life. Next to the bishops are the presiding elders, who preside over the Quarterly Conference, which consists of the pastors, preachers, stewards, class-leaders, trustees and Sunday school superintendents of a single charge. The sessions of this conference are called

Quarterly Meetings. By their council the presiding elders aid the bishops in the stationing of pastors. Their term of office is six years. Candidates for the ministry, upon examination and two years' trial as a preacher, may be admitted to the General Conference and ordained deacon, and two years after, elder. Deacons, elders and preachers usually perform the same duties—they are the pastors. Class-leaders preside over "classes" in the church, which meet weekly. Admission to the church is granted, as a rule, after six months' probation. Pastors were, in 1804, obliged to change their charges every two years, but the time was extended in 1888 to five years, except in certain cases.

An inspection of the records of the General Conferences from 1784 to 1896 shows that, from time to time, various questions relating to the organization, discipline and wellbeing of the church have arisen in the conferences, an account of the more important of which is here briefly given. A notable one, not yet settled, is the question of membership in the General Conference. In 1800 membership was restricted to preachers who had traveled four years. In 1808 provision was made for *Delegated General Conferences*—delegates to be not more than one for every five members of an annual conference. In 1824, and again in 1840 and 1856, it was decided that a lay delegation was inexpedient, but in 1860 it was ordered that the question be submitted to the annual conferences and the male membership of over 21 years of age. The conferences and membership having approved of lay delegates, they were for the first time admitted in 1872. The eligibility of women to a seat in the General Conference was discussed in 1888 and decided adversely, on constitutional grounds; the same decision was reached by the conference of 1892, when it was voted that the term *laymen* includes men only; but it was ordered to submit the question to a vote of the annual conferences. In 1896 the proposal failed by only 66 votes to secure the requisite three-fourths majority, out of a total of 10,159 votes. The sentiment in favor of admitting women is growing, and the question will again come up in the conference of 1900.

On the question of slavery the church took action at the beginning, declaring it to be contrary to the law of God and the principles of the Declaration of Independence. Although the question had been more or less agitated after that time, the conference of 1836 began in earnest to consider the matter; two members were censured by a vote of 120 to 14 for lecturing at an abolition meeting in Cincinnati during the session of the conference. In the conference of 1844 many days were spent in a slavery debate. A member was suspended for holding slaves, and Bishop Andrew was requested to cease exercising the functions of his office for the same cause. A number of Southern conferences remonstrating, a committee was appointed to prepare a plan of division of the church. In 1845 the Methodist Episcopal Church South was organized and the property of the church divided.

The Methodist preachers of the United States felt from the very first the great need of Methodist lite-

ture for the education and help of the members. Accordingly, what is known as the *Book Concern of the Church* was established in Philadelphia in 1789 on a borrowed capital of \$600. From this small beginning the concern has reached gigantic proportions. Its eastern headquarters are now in New York City and the western in Cincinnati (established in 1820), with depositories in the larger cities from Maine to California. In the official report of 1896 it is stated that the combined capital of the two houses is \$3,396,952; total sales for the year, \$1,857,322; and total profits, \$194,472. It is estimated that the two houses have published books, etc., to the value of more than \$60,000,000, with \$6,000,000 clear profits. Since the division of the church in 1844 the sales of both houses have been \$52,729,283. The supervision of the publishing interests of the church is committed to a *book committee* appointed by the General Conference. In addition to books, the church also issues, under the supervision of the General Conference, monthly magazines, weekly papers, some in German and Swedish, Sunday-school journals, tracts, etc., the circulation of which varies from 4,000 to 715,000.

Of benevolent societies instituted by the church may be named, first, the *Missionary Society*, organized in 1819. This society is managed by a board, consisting of the bishops *ex officio*, thirty-two ministers and thirty-two laymen elected by the General Conference. The fields to be occupied, persons employed and the appropriations for the support of each are determined by a General Missionary Committee selected by the General Conference. The receipts of this society for the year 1894-95 was \$1,072,990, and disbursements \$1,237,845. The committee called for \$1,500,000 for missions in 1896.

The second oldest official benevolence of the church is *The Sunday School Union*, established in 1840. Its managers are 32 ministers and 32 laymen, appointed by the General Conference. By last report, 9,355 churches contributed, during the year, \$22,542; schools aided, 4,054; copies of English periodicals circulated, 36,682,840; German, 2,168,860.

The Tract Society was organized in 1852. Since 1854 it has operated, also, in foreign countries, and every mission of the church has been helped to publish religious literature in its own spoken language. By last report \$20,554 was received during the year, and \$19,022 disbursed.

Another important society under the management of the General Conference is the *Board of Church Extension*. Its resources are derived from collections and personal gifts, and from a loan fund, derived from special gifts, available only for loans. Its affairs are under the supervision of three associate bodies. In the thirty years ending 1895, this board had received and disbursed about \$5,500,000. The amount authorized in aid in building houses of worship for the year 1896 was \$315,250.

The Freedmen's Aid and Southern Education Society, organized in 1866, had expended, at the close of 1895, over \$4,000,000 in establishing and sup-

porting institutions of Christian learning in the South. The total receipts for the year ending June 30, 1895, was \$367,809; total expenditures, \$358,500.

The *Board of Education* is the central agency for the promotion of higher education in the church.

The *American Bible Society* has for its field of operation the whole world. The Bible is sent to all nations. The amount expended in the foreign field in 1895 was \$184,538. This society has issued in the past 79 years 59,955,558 copies of the Bible.

The *Woman's Foreign Missionary Society* was organized in 1869 to save heathen womanhood. Its representatives are in Japan, India, South America and other foreign countries. Its 152 missionaries have established day and boarding schools, hospitals, etc. Sixty thousand patients receive medical attention annually.

The *Woman's Home Missionary Society* is doing similar work in the United States. The receipts for the year ending July, 1895, were \$236,457.

The *Epworth League* is an organization managed by a board of control appointed, in General Conference, by the bishops, ministers and laymen. The object sought is a broader culture among young people, their larger attendance upon the higher institutions of learning, the providing of lectures for instruction on the University Extension plan, etc. The league came into existence in May, 1889, by the consolidation of various societies whose representatives had met in Cleveland, Ohio, for conference, with the idea of this union in view. The growth of this society has been unprecedented. In May, 1895, its total membership was 1,250,000. In June, 1895, the leagues of the Methodist Episcopal Church, the Church South and the Canadian Church met in Chattanooga, Tennessee, in a sort of international conference, to the number of 1,500 persons.

The idea of an *American University*, which should stand at the head of the educational institutions of the church, was entertained as far back as 1850. For forty years thereafter it was the topic of conversation in the General Conferences and among educators and public men. In 1890 the first subscriptions were received and the first installment paid on a site in Washington, District of Columbia. In May, 1891, a certificate of incorporation from the District of Columbia was issued, and the organization of the university effected by the election of 36 trustees, a chancellor, secretary and registrar. The General Conference in 1892 adopted the university and approved its trustees. In 1893 a new and enlarged charter was granted by Congress and signed by the President of the United States. In January, 1895, plans for the location of the site were received, and in March the last payment on the site was made.

The idea of a special training of women for religious work found its realization in the *Missionary and Deaconess Training Schools*, in which are taught Bible and church history, temperance, domestic science, physical culture, the principles of medical science, nursing, hygiene and sanitation. Schools are located in Minneapolis, Kansas City, New York, Chicago, Washington, San Francisco and other cities,

to the number of fourteen, the most prominent of which are the Lucy Webb Hayes Memorial Training School, Washington, District of Columbia, and the Chicago Training School. Protection and counsel to thousands of immigrant young women, who are homeless and strangers in a strange land, are afforded in the *immigrant homes*, under the supervision of the Woman's Home Missionary Society. These homes are in Boston, New York and Philadelphia. For the year ending July 1, 1895, 6,544 lodgings were provided, 23,685 meals furnished, 96 situations secured, 602 letters and postals written, 114 girls sent to friends, etc.

Children's institutions for the training of needy children are established in the principal cities, and their number is steadily increasing.

Hospitals for the care and treatment of the sick have been established by the church in the larger cities, each having a medical staff, trained nurses, etc.

What is called *Deaconess Work* is a voluntary association of women for such work as the church may have for them to do. The General Conference has recognized the work and prescribed rules for its regulation. The deaconesses receive no salary, are costumed, and must live in communities called *homes*. They act as pastors' assistants, visit from house to house, conduct meetings for women and children, visit prisons and police-stations, conduct orphanages, assist in hospitals, nurse among the sick poor, edit papers, etc. The number of these homes in the United States is 18. Another benevolent institution for which the church has a growing regard is *Homes for the Aged*, of which there are six in the United States under the supervision of the church.

The *Itinerant's Club* was organized in 1889 for the purpose of enlarging the world in which the young minister lives, and to aid him in his endeavor to acquire the best and highest general and professional culture. Young ministers who have lacked the training of the seminaries and colleges are especially benefited by this club, which provides courses of lectures in systematic theology, exegesis, Christian sociology and practical theology. Since its organization there has been greater interest in general ministerial education throughout the church and the standards of examination in the annual conferences have been greatly improved.

Other Methodist churches in the United States are as follows:

THE METHODIST EPISCOPAL CHURCH SOUTH. As before mentioned, the Methodist Episcopal Church divided on the question of slavery in 1844. May 1, 1845, the slave holding conferences met in Louisville, Kentucky, and organized the Methodist Episcopal Church South. Before the Civil War it published weekly, monthly and quarterly periodicals, and had 76 academies and colleges. During the war its educational, publishing and missionary interests were nearly destroyed and its membership greatly reduced. By official reports in 1895 this church has 5,868 traveling and 6,724 local preachers; the white members number 1,382,765, and colored and Indian 5,058; Sunday schools 13,873, teachers 99,338, scholars 811,579; church edifices

13,581, value \$21,093,918; parsonages 3,282, value \$3,780,149; contributions for foreign missions \$215,815, domestic missions \$130,919, total \$347,654; appropriations for presiding elders \$281,080, for preachers in charge \$2,019,551, for bishops \$36,843; chapters of Epworth League 1,950, members 87,750.

AFRICAN METHODIST CHURCH. Total itinerant ministers, local preachers and exhorters, 20,250; total of members, 599,141; church edifices, 4,575; value, \$8,650,155; universities, colleges and schools, 41; value, \$756,475; expense (1894-95) for preachers, publication, church extension, Sunday schools, missions, etc., \$1,370,127; for education, professors and teachers, books, etc., \$978,870.

AFRICAN METHODIST EPISCOPAL ZION CHURCH. Traveling and local preachers and exhorters, 2,397; membership, 394,562; Sunday schools, 2,175; officers and teachers, 13,145; scholars, 108,820; church edifices, 1,605; value of church property and parsonages, \$3,019,084.

AFRICAN UNION METHODIST PROTESTANT CHURCH. Traveling and local preachers, 1,550; total membership, 7,000; Sunday schools, 350; officers and teachers, 900; scholars, 2,770; church edifices, 700; value of church property, \$60,000.

COLORED METHODIST EPISCOPAL CHURCH IN AMERICA. Traveling and local preachers, 4,083; membership, 170,718; Sunday schools, 4,007; teachers, 7,098; scholars, 79,876; church edifices, 4,004; schools, 6; students, 907; value of school property, \$98,000.

CONGREGATIONAL METHODIST. Membership, 12,500; ministers, 204; church edifices, 238.

CONGREGATIONAL METHODIST (COLORED). Ministers, 5; churches, 5; members, 319.

EVANGELIST MISSION. Ministers and local preachers, 114; membership, 4,600; churches, 13; Sunday school scholars, 1,200; value of church property, \$25,000.

FREE METHODIST. Traveling and local preachers, 1,660; members (1894), 26,140; Sunday schools, 942; scholars, 32,552; value of church property, \$1,069,074.

INDEPENDENT METHODIST. Ministers, 8; churches, 15; members, 2,569.

METHODIST PROTESTANT. Ministers and local preachers, 1,965; membership, 166,032; churches, 2,042; parsonages, 460; value of churches and parsonages, \$4,602,243; Sunday schools, 1,844; officers and teachers, 16,235; scholars, 105,314; pastors' salaries, \$296,974.

NEW CONGREGATIONAL METHODIST. Churches, 35; membership, 1,200; Sunday schools, 25; value of church property, \$5,000.

PRIMITIVE METHODIST. Traveling and local preachers, 208; members, 6,340; Sunday-schools, 108; scholars, 11,750; churches, 100; parsonages, 41; value of property, \$416,143.

UNION AMERICAN METHODIST EPISCOPAL. Ministers, 115; churches, 115; communicants, 7,031.

WESLEYAN METHODIST. Membership, 18,141; Sunday schools, 465; scholars, 18,344; value of church property, including churches, parsonages and publishing house, \$580,472.

ZION UNIÓN APOSTOLIC. Ministers, 30; churches, 32; communicants, 2,346.

The latest revised returns for all the religious denominations of the United States for 1895 show a grand total of 125,503 ministers, of which the Methodists had 32,369, or more than 25 per cent; grand total number of churches, 178,754, Methodist 53,537, or nearly 30 per cent; grand total of communicants, 2,3614,443, Methodist 5,124,636, or more than 21 per cent. With the exception of the Catholic Church, which had 7,742,774 communicants, the Methodist denominations of the United States outrank any other in number of churches, ministers and communicants.

D. O. KELLOGG.

METHODIST PROTESTANT. See **METHODIST CHURCHES**, in these Supplements.

METHUEN, a town of Essex County, northeastern Massachusetts, two miles N.W. of Lawrence, on the Boston and Maine railroad. It manufactures cottons, woollens, jute, hats and shoes. It has a public library, the Nevins Memorial, with 13,000 volumes; and has water-works and electric railways to neighboring cities. Population 1890, 4,814; 1895, 5,690.

METHYL ALCOHOL, CARBINOL OR PYROXYLIC SPIRIT. Methyl alcohol is found with acetic acid, acetone and water in the product obtained by distilling wood. Chemically, it is related closely to ordinary alcohol, and has the formula CH^3OH . It is used commercially in making dyes, and in England the crude form is mixed with ordinary alcohol, and the combination is sold, duty free, for the preparation of varnishes and other industrial purposes.

METICS. See **SOLON**, Vol. XXII, p. 255.

METIS. See **ZEUS**, Vol. XXIV, p. 782.

METONIC CYCLE. See **CALENDAR**, Vol. IV, p. 668.

METRE OR METER AND METRIC SYSTEM. See **WEIGHTS AND MEASURES**, Vol. XXIV, pp. 480, 490.

METRES OR METERS, in verse. See **PROSODY**, in these Supplements.

METROPOLIS CITY, a city and the capital of Massac County, southern Illinois, on the Ohio River, forty miles from its mouth, and on the St. Louis, Alton and Terre Haute railroad. It has a steam-ferry, shipyards, pipe foundry, pottery and saw and flour mills. It is built on the site of a fort constructed by the French about 1700. It has a public library and several newspapers and graded schools. Population 1890, 3,573.

METTRAY, a village of France, five miles N. of Tours, noted for its great agricultural and industrial reformatory, the parent of all such institutions. This reformatory dates from 1839, and in 1886 had 537 inmates.

MEXICO, REPUBLIC OF. (For general description, geographical and historical, see Vol. XVI, pp. 206-222.) Mexico has enjoyed peace under the continuous administration of Porfirio Diaz from 1887 until 1896. During this period the country has developed to a very great extent. Colonization has been encouraged; large concessions of land to

corporations and private individuals have resulted in the extension of railroads, opening of mines and the establishment of large irrigation plants in districts suited to agriculture; profitable commercial treaties have been negotiated with the United States, Great Britain and Germany.

CONSTITUTION AND EXECUTIVE GOVERNMENT. The Mexican constitution now in force was adopted Feb. 5, 1857, and modified at different dates down to 1887. Under its terms, Mexico is declared a federative republic, divided into states—19 at the outset, but at present 27 in number, with two territories and the Federal District—each of which has a right to manage its own local affairs, while the whole are bound together in one body politic by fundamental and constitutional laws. The powers of the supreme government are divided into three branches, the legislative, executive and judicial. The legislative power is vested in a Congress, consisting of a House of Representatives and a Senate, and the executive in a president. Representatives, elected by the suffrage of all respectable male adults, at the rate of one member for 40,000 inhabitants, hold their places for two years. The qualifications requisite are to be 25 years of age and a resident in the state. The senate consists of 56 members, two for each state, of at least thirty years of age, who are returned in the same manner as the deputies. The members of both houses receive salaries of \$3,000 a year. The President is elected by electors popularly chosen in a general election, holds office for four years, and, according to an amendment of the constitution in 1887, may be elected for two consecutive terms of four years each. The Senator who presides over the Senate by monthly election acts temporarily, in default of the President of the Republic. Congress meets annually, from April 1st to May 30th, and from September 16th to December 15th, and a permanent committee of both houses sits during the recesses.

President of the Republic, 1897, General Porfirio Diaz, installed President of the Republic, as successor of General Manuel Gonzales, Dec. 1, 1884, and has been thrice re-elected, entering upon his fourth term Dec. 1, 1896. The administration is carried on, under the direction of the President, by a council of seven secretaries of state, heads of the departments of Justice, Finance, the Interior, War and Navy, Foreign Affairs, Home Affairs, and Public Works. The President's salary is \$30,000.

Each separate state has its own constitution, government and laws. Each has its governor and legislature, elected under rules similar to those of the federation. The civil and criminal codes in force in the Federal District prevail in the different states, with the exception of the states of Mexico and Vera Cruz.

POPULATION AND AREA. The following table gives the populations of the Federal (capital city) District and the states severally, as officially estimated by the state governments in 1893. (For the 1880 census, see Vol. XVI, p. 214.)

There are many and serious difficulties in the way of successful colonization, and a large proportion of immigrants in recent years have left the country.

NAME OF STATE.	AREA IN SQUARE MILES.	POPULATION (ESTIMATED) 1893.
<i>Atlantic States.</i>		
Tamaulipas -----	32,128	167,777
Vera Cruz -----	29,201	723,732
Tabasco -----	10,072	114,028
Campeche -----	18,087	93,976
Yucatan -----	35,203	329,721
<i>Inland States.</i>		
Chihuahua -----	87,802	298,073
Coahuila -----	63,569	177,793
Nuevo Leon -----	23,592	293,793
Durango -----	38,009	265,931
Zacatecas -----	24,757	526,966
San Luis Potosi -----	25,616	546,447
Aguascalientes -----	1,950	140,180
Guanajuato -----	11,370	1,007,116
Querétaro -----	3,556	213,525
Hidalgo -----	8,917	506,028
Mexico -----	9,247	826,165
Federal District -----	463	575,747
Morelos -----	2,773	151,540
Tlaxcala -----	1,595	149,808
Puebla -----	12,204	839,125
<i>Pacific States.</i>		
Lower California (Ter.) ---	58,328	34,668
Sonora -----	76,900	150,391
Sinaloa -----	33,671	223,684
Tepic (Ter.) -----	11,275	131,019
Jalisco -----	31,846	1,250,000
Colima -----	2,272	72,591
Michoacan -----	22,374	830,000
Guerrero -----	24,996	353,193
Oaxaca -----	35,382	793,419
Chiapas -----	27,232	269,710
Islands -----	1,420	-----
Grand Total -----	767,005	12,056,046

Of the total population, 19 per cent were of pure or nearly pure white race, 43 per cent of mixed race, and 38 per cent Indian.

The chief cities, in 1893, estimated their populations thus: Mexico, 329,535; Guadalajara, 95,000; Puebla, 110,000; San Luis Potosi, 62,573; Guanajuato, 52,112; Leon, 47,739; Monterey, 52,000; Aguascalientes, 32,355; Merida, 32,000; Oaxaca, 27,856; Morelia, 30,000; Colima, 25,154; Pachuca, 40,500; Jalapa, 18,000; and Vera Cruz, 30,000 (1895).

In 1890 but 7,215 foreigners were residents of the City of Mexico.

RELIGION AND INSTRUCTION. The prevailing religion is the Roman Catholic; but the church is independent of the state, and there is toleration of all other religions. The latest census gives 10,112 Roman Catholic churches and 49 Protestant churches in the Republic. No ecclesiastical body can acquire property. In almost all the states education is free and compulsory. In 1888 there were 10,726 primary schools, with 543,977 pupils. The number attending 227 higher and professional schools is stated at 21,000. The entire amount paid for education is \$3,512,000, of which the Federal government contributes \$995,314. In 1890, in the City of Mexico, there were 176,692 persons who could neither read nor write, and 15,268 who could read only. In 1893 there were, in the republic, over 100 public libraries, including the National Library, with 159,000 volumes, and eight other libraries with over 10,000 vol-

umes each, 22 museums and three meteorological observatories. The number of newspapers published was 307.

The judiciary consists of the supreme court, with 15 judges chosen for a period of six years; nine circuit courts, and 38 district courts. The judicial power is independent of the executive.

FINANCE. The revenue and expenditures for the five years (1890-95) are as follows:

REVENUE.		EXPENDITURE.	
1890-91-----	\$39,970,000	1890-91-----	\$38,452,803
1891-92-----	41,550,000	1891-92-----	38,377,365
1892-93-----	40,870,000	1892-93-----	40,367,047
1893-94-----	40,060,000	1893-94-----	41,076,260
1894-95-----	43,074,053	1894-95-----	43,054,371

These totals are estimated for each year ending June 30. The official estimates for 1896 placed the revenue at \$45,234,900 and the expenditure at \$46,067,914. Of the revenue, 50 per cent is derived from customs, 39 per cent from internal taxation, and 11 per cent from other sources. The public debt, June 30, 1894, was: External debt \$103,438,300, and internal debt \$83,965,552; total \$187,403,822. The fiscal value of property (one third less than the actual value) in 1891 was \$497,865,196. The 11 mints coin annually an average of \$25,000,000. Most of the silver coined into dollars is exported to China and the Eastern Archipelago.

MINERALS. Mexico is rich in precious stones. For centuries, her people neglected all else and devoted themselves to mining. The country became impoverished, and the inhabitants ignorant and indolent. While, since the foundation of the present republic and the consequent prosperity, agriculture and other business have again been taken up, yet the mineral wealth of Mexico is still her chief attraction and source of income. By the wise foresight of the makers of the constitution, the great portion of the land became public property, to be sold or conceded, under certain conditions and restrictions. The mines remain the property of the state, the products going to the worker of the lodes only so long as he actively continues mining operations. Upon the suspension of operations, the mine reverts to the state. Thus speculation in mining properties is hindered, if not prevented. The difficulty of access to the mines has prevented the establishment of large plants equipped with modern machinery. The extension of the various railway systems will, in time, no doubt, do away with this hindrance. As yet, many of the primitive methods are employed in mining and reducing the ores. Silver is the most abundant mineral, occurring chiefly on the eastern slope of the Sierra Madre, while gold is found principally on the western slope. Other minerals found are lead, iron, copper, quicksilver, tin, cobalt, antimony, sulphur; coal and petroleum are also found. In 1894 there were, in the country, 3,167 mining enterprises, two thirds belonging to Mexican companies. During the twelve years ending June 30, 1892, there were exported gold coin and bullion valued at \$10,123,924; silver, \$323,520,728; lead, \$6,399,532; and copper, \$4,105,116; total, \$401,096,632. In 1893 the value of the gold output was \$1,326,564, and of the silver, \$56,467,431. In 1895

there were 11 mints in Mexico. Every producer is free to have his bullion coined, the mints receiving 4.62 per cent for gold and 4.41 per cent for silver.

INDUSTRY AND COMMERCE. It is estimated that Mexico had, in 1895, 479 square leagues of forest, 18,134 square leagues of mountain land, and 4,822 square leagues of uncultivated land. The government offers inducements to colonization, and assists in the distribution of seeds and plants. The chief agricultural products are rice, maize, barley, wheat and beans. Coffee, cocoa and tobacco have recently been given more attention. In 1892-93 the coffee exported amounted to 14,285 tons, and in 1893-94 to 18,568 tons. Yucatan is the principal producer of henequen; the fiber exported in 1893-94 was 124,576,964 pounds. There were 20,574 cattle-ranches in 1883. Northern Mexico possessed, on an area of about 300,000 square miles, 1,500,000 cattle, 2,500,000 goats, 1,000,000 horses, and 1,000,000 sheep. In 1893 there were, in Mexico, 2,899 factories for sugar and brandy; 123 for woolen and cotton goods; 41 for tobacco; total, 3,844.

The imports in 1894-95 were valued at \$34,000,440 and the exports at \$90,854,953. Of the imports, \$15,130,367 worth came from the United States, and of the exports, \$67,322,986 worth.

RAILWAYS, SHIPPING, ETC. In 1895 there were 6,322 miles of railway and 127 miles of tramway in operation. The telegraph lines were 39,193 miles in length, of which 26,152 miles belonged to the Federal government. There were 1,453 post-offices, the receipts of which were \$1,358,348, and the expenses \$1,268,354. In 1893-94, 1,211 vessels in the foreign trade cleared from Mexican ports, and 7,721 engaged in the coasting-trade.

DEFENSE. In 1895 the army consisted of 23,730 infantry, 11,069 cavalry, 2,304 artillery. Of the total, 2,270 are officers. Every Mexican capable of bearing arms is liable for military service from his twentieth to his fiftieth year. The navy consisted, in 1895, of 2 dispatch vessels, 2 unarmored gun-vessels, a steel training-ship and 5 torpedo-boats in course of construction.

MONEY AND MEASURES. The standard of value is silver. There is no paper currency except bank notes. The metric system of weights and measures became the legal standards in 1896, and the use compulsory.

MEXICO, a city and the capital of Audrain County, northeastern central Missouri, 108 miles N.W. of St. Louis, on the Chicago and Alton and the Wabash railroads. It is in a grain, hay and live-stock producing region. It is the seat of Hardin College, a military academy, and a seminary for women. Flour, fire-brick, wagons and plows are manufactured. Population 1890, 4,789.

MEXICO, a post village of Oswego County, northwestern central New York, 14 miles E. of Oswego, on the Rome, Watertown and Ogdensburg railroad and on Salmon Creek. It has a tannery, flour and grist mills, agricultural tool factory, cannery, foundry and carriage factories. Population 1890, 1,315.

MEXICO, GULF OF. See MISSISSIPPI, Vol. XVI,

pp. 520, 521; and UNITED STATES, Vol. XXIII, pp. 791, 792.

MEXICO, STATE OF, an inland district of central Mexico, in which is situated the capital of the republic. It is very mountainous, being in the center of the Anahuac Plateau. Its highest peak is the Nevado de Toluca, 14,020 feet high. The principal products of the state are silver, gold, mercury, sulphur, marble, cereals, and in the valleys cotton and sugar-cane are raised. Area, 9,247 square miles. Population 1893, 826,165. Capital, Toluca, with 12,000 inhabitants.

MEYER, ADOLPH BERNHARD, a German ethnologist and ornithologist; born in Hamburg, Germany, Oct. 11, 1840; graduated in philosophy and medicine from the universities of Göttingen and Vienna; studied also in Zürich and Berlin. After an extensive scientific journey through the Malay and Philippine islands, lasting three years, he was appointed curator of the Royal Zoölogical and Anthropo-ethnographic Museums at Dresden, Saxony, and after he entered his duties, published 16 volumes of reports and monographs concerning the contents of these museums. He wrote also *Abbildungen von Vogelskelette* (parts 1-21, 1879-94); *Die Hirschgeweihsammlung zu Moritzburg* (folio, with 62 plates, 1883-87); and *Album von Philippinentypen* (with 82 plates, 1885-89).

MEYER, HANS, a German traveler; born March 22, 1858, at Hildburghausen, Germany; studied at Leipsic, Berlin and Strasburg. Shortly after leaving the university he traveled extensively in India, Eastern Asia, America, the Philippine Islands and Africa. In 1888, accompanied by O. Baumann, he undertook a well-organized expedition to the Kilima Ndscharo, which was stopped by the insurrection that had taken place, in the mean time, in the district of the German East African Company. Meyer and Baumann were taken prisoners by the Arab chief Bushiri, robbed of all their property, and released only by the payment of a large ransom. On his return to Europe he published *Zum Schneedom des Kilima Ndscharo* (1888), with forty photographs. Accompanied by the Austrian mountaineer, Purtscheller, he soon undertook a new expedition. The Kibo was scaled, the highest peak of which was named the Emperor William's Peak, and was estimated to be about six thousand metres elevation. At the same time a large crater was discovered on the Kibo, and on its side the first glacier ever discovered in Africa.

MEYER, HEINRICH AUGUST WILHELM, a German Biblical scholar and commentator; born in Gotha, Germany, Jan. 10, 1800. He studied at Jena; was pastor at Osthause, Harste, Hoyde and Neustadt; retired in 1848 and settled in Hanover. For forty years he was recognized, both in Germany and abroad, as a leader among modern commentators of the New Testament. His views were broadly liberal and closely in touch with the latest historical researches, while his faith in revelation remained staunchly orthodox. An English translation of his writings appeared in Edinburgh (20 vols., 1873-82) and in New York (11 vols., 1884-88). He died in Hanover, June 21, 1873.

MEYER, JOHANN GEORG, called "Meyer von Bremen," a German painter; born in Bremen, Oct. 28, 1813. He studied art at Düsseldorf, settled in Berlin in 1852, and turned his attention to *genre*, acquiring great popularity by his pictures of children and domestic life. He was appointed professor at the Berlin Academy of the Fine Arts in 1863; awarded a medal at the Centennial Exhibition in Philadelphia in 1876. Several of his pictures, mostly of a diminutive size, are owned in America, the New York Metropolitan Museum owning *The Letter*. He died in Berlin, Dec. 6, 1886.

MEYER, MARIE PAUL HYACINTHE, a French palæographer and philologist; born in Paris, Jan. 17, 1840; graduated from the École des Chartes in 1861, and after being an *attaché* of the Section of Manuscripts at the National Library in 1863-65, was appointed one of the keepers of the National Archives from 1866 to 1872, and Secretary of the Écoles des Chartes from 1872 to 1875. He succeeded Edgar Quinet as professor of the languages and literatures of southern Europe at the Collège de France in 1876; and in 1882 he was placed at the head of the École des Chartes. He was awarded the 20,000-franc prize by the Institute in 1883, and in the same year was elected a member of that famous body. His life-work consists in discovering, editing and publishing rare manuscripts connected with Romance literature, French and Provençal especially; among these are *Le Roman de Flamenca* (1865); *Guillaume de la Barre* (1868); *La Chanson de la Croisade Contre les Albigeois* (2 vols., 1875-79). He wrote also *Recherches sur l'Épopée Française* (1867); *Mémoire sur les Dialectes de la Langue d'Oc au Moyen-âge* (1874); *Alexandre-le-Grand dans la Littérature Française du Moyen-âge* (2 vols., 1886).

MEYERSDALE, a borough of Somerset County, southwestern Pennsylvania, 36 miles E. by S. of Uniontown, on the Baltimore and Ohio railroad. It is in an agricultural and mining region, and manufactures flour, lumber, furniture, stoneware and iron castings. Population 1890, 1,847.

MEYNERT, THEODORE, a German physician; born in Dresden, Saxony, June 15, 1833; received his M.D. from Vienna University in 1861, where he pursued his career as an instructor; director of the Vienna Insane Asylum in 1866; director of the psychiatric clinic and lecturer on psychiatry in 1870; professor of neurology in 1873; Privy Councillor in 1885, and a member of the Imperial Academy of Sciences. He devoted his attention to the anatomy and diseases of the brain and other nervous centers, and became an authority on these subjects. He wrote *Zur Mechanik des Gehirns* (1874). *Psychiatrie Klinik der Erkrankungen des Vorderhirns* (1884).

MEYRICK, FREDERICK, an English divine; born in Ramsbury, Wiltshire, England, Jan. 28, 1827; graduated in 1847 from Trinity College, Oxford, of which he was successively scholar, fellow and tutor, and held the university offices of select preacher and public examiner. He was one of the Queen's Whitehall preachers in 1856; inspector of schools in 1859; rector of Erpingham in 1868; canon of Lincoln in 1869. He was one of the founders of the Anglo-Continental Society for making known in foreign

countries the principles of the English church. To help in this work, he published a number of controversial treatises in Latin, Italian, Spanish, etc. He contributed to Dr. Smith's *Dictionary of the Bible and Dictionary of Antiquities*, to a number of commentaries on different books of the Bible, and was for 17 years editor of the *Foreign Church Chronicle and Review*.

MEZEREUM, a name given to *Daphne Mezereum*, a European shrub of the family *Thymelæaceæ*, with rose-colored flowers, in lateral clusters, in early spring, before the leaves appear, and red berries. It is cultivated for ornament.

MÉZIÈRES, ALFRED JEAN FRANÇOIS, a French littérateur, educator and statesman; born in Rehon, Lorraine, Nov. 19, 1826; graduated from Sainte-Barbe College, in Paris, and from the Superior Normal School. He was professor in the Metz Lyceum in 1844; sent to the French School in Athens in 1850. Having passed his examination for the degree of doctor of letters, he was called to the Sorbonne as assistant professor of foreign literatures in 1861, and as full professor in 1865. He represented the University of France at the Shakespeare jubilee in 1864, and at the Dante jubilee in 1865. During the Franco-Prussian war he took active service in the National Guard; was elected a member of the Academy in 1874; as a deputy on the Republican list in 1881, he wrote the report of the commission on artistic and literary property and the international agreements relating thereto. Re-elected to the Chamber in 1885, he showed himself a strong opponent of General Boulanger. At the elections of 1889 he was re-elected, and shortly afterward was appointed by his colleagues president of the commissions of the army. He wrote *Shakespeare, ses Œuvres et ses Critiques* (1861-82); *Prédécesseurs et Contemporains de Shakespeare* (1863); *Contemporains et Successeurs de Shakespeare* (1864); *Goethe, les Œuvres Expliquées par la Vie* (1872-73); *Vie de Mirabeau* (1891). He was a regular contributor to the *Temps* and the *Revue des Deux Mondes*.

MIALL, EDWARD, an English clergyman; born in 1809. He served as an Independent minister at Ware, Hertfordshire, and afterward at Leicester, down to 1840, when he founded the *Nonconformist* newspaper. In 1844 he helped to establish the British Anti-State Church Association, known later as the Liberation Society, and devoted to agitating the separation of church and state; he sat in the House of Commons for Rochdale (1852-67), and for Bradford (1869-74). In 1863 his friends presented him with a purse of 5,000 guineas, and, on his retiring from public life, 10,000 guineas were placed, in trust, for the use of himself and family, as his devotion to the cause had prevented him from providing for his needs in old age. He wrote *Title Deeds of the Church of England and British Churches in Relation to the British People*. He died at Sevenoaks, Kent, April 29, 1881.

MIAMI, a river of southwestern Ohio, which rises by several branches in Hardin County, in the western central part of the state, and after a southwest course of 150 miles through one of the richest regions of America, and the important towns of Dayton and

Hamilton, empties into the Ohio River 20 miles below Cincinnati. It is rapid and of great value for motive power. The Miami canal follows its valley.

MIAMI, LITTLE, a river about 25 miles E. of the Miami, and about parallel with it. It rises in Madison County, and enters the Ohio seven miles above Cincinnati. Its valley is fertile and hilly, and it is serviceable for its motive power.

MIAMI INDIANS, a title of the Algonquin family of Indians roving along the upper Great Lakes of North America, and occupying originally the basin of the Great Miami River. When met by French *voyageurs* in 1658, near Green Bay, large numbers of the Miamis lived in palisaded villages. Their hatred of the Iroquois caused them to take sides with the English in 1755-60, and they remained their allies during the Revolutionary War. They fought against the advance of the pioneers in 1790, and defeated General St. Clair in 1791; but General Anthony Wayne forced them to ask for peace in 1795. Again, in 1812-15, they took the field against the Americans. After 1818 they removed to Indiana; in 1846 they were transferred to a reservation on the Osage River, in Kansas; but soon their individuality as a tribe disappeared, and they are merged now with the Peorias and Quapaws, and numbered, according to the government report, 86 in 1895.

MIAMISBURG, a post village of Montgomery County, southwestern Ohio, 11 miles S. of Dayton, on the Miami canal, and on the Cleveland, Cincinnati, Chicago and St. Louis and the Cincinnati, Hamilton and Dayton railroads, in the center of the tobacco region of the Miami valley. It has fine water-power, several mills and factories, a foundry and excellent schools. Population 1890, 2,952.

MIAMI UNIVERSITY, a non-sectarian institution of learning, located at Oxford, Ohio; chartered as a college in 1824; had existed as a grammar-school since 1809. As far back as 1802 the state of Ohio granted land in the township of Oxford, Butler County, for the establishment of a college, and has paid an annual amount for its maintenance. Since its organization, 1,093 students have graduated from Miami University. In 1895 it had 12 instructors, 125 students and 13,000 volumes in its library. There are no tuition fees; the productive funds of the corporation amount to \$85,000 and its revenues to \$27,000.

MIANTONOMOH, a Narragansett Indian sachem and the father of Canonchet, the ally of King Philip. From him was conveyed to Roger Williams, in 1636, the land upon which the city of Providence now stands. In spite of his protestations of friendship, he was summoned to Boston to answer accusations of treachery, but was acquitted honorably. Several times he led his tribe against their hereditary enemies, the Mohicans, under their chief, Uncas, and finally, in a battle near Norwich, he was defeated by Uncas, and was obliged to take refuge with the Hartford colony. Claimed by Uncas as his prisoner, he was delivered to him and put to death in 1643. A granite monument has been erected over his grave at Granville, on the She-

tucket River, Rhode Island, and a monitor of the United States Navy bears his name.

MIASMA. See MALARIA, Vol. XV, p. 316.

MIAULIS, ANDREAS VOKOS. See GREECE, Vol. XI, p. 125.

MICAS. See MINERALOGY, Vol. XVI, pp. 412, 413.

MICA-SCHIST. See GEOLOGY, Vol. X, p. 231.

MICHAELMAS FESTIVAL. See MICHAEL, Vol. XVI, p. 226.

MICHEL, FRANÇOIS ÉMILE, a French painter and art critic; born in Metz, Lorraine, July 19, 1828; graduated from the Metz Lyceum in 1845; studied painting in his native city, under Migette and Marichal (the famous painter on glass); after 1853, when he made his *début* with *La Gardeuse d'Oieo*, he had one or two of his landscapes exhibited at the Paris Salon; was awarded medals in 1868 and 1889 at the International Exposition; and in 1892 was elected an associate member of the Academy of the Fine Arts and a member of the commission of paintings at the Louvre Museum. He took high rank as an art critic. He wrote *Le Musée de Cologne* (1883); *Les Musées d'Allemagne* (1885); *Rembrandt* (1886); *Hobbéma* (1890); *Jacob van Ruysdael* (1890). Among his most noted pictures are *Semaines d'Automne* and *La Dune près de Harlem*, both at the Luxembourg Museum, in Paris; *La Récolte des Olives* and *Chasse sur la Falaise*, both at the Metz Museum; *Nuit d'Été*, at the Nancy Museum; *En Forêt* (1889); *Un Village Abandonné* (1890).

MICHEL, LOUISE, a French revolutionary leader; born in Vroncourt, France, in 1839; first distinguished herself by her poetical and musical talents, which were recognized and encouraged by Victor Hugo. In 1860 she opened a school in the Quartier Montmartre, Paris, and in 1871 took an active part in the doings of the revolutionary Commune, and when it collapsed (May, 1871) was made a prisoner and sentenced to transportation for life. On the amnesty to political prisoners in 1880 she returned to Paris, and, continuing to take part in Communist assemblies, she was re-imprisoned in 1883, and again in 1886. She finally settled in London. She published her *Mémoires* (1886), an unsuccessful play based on a Communistic incident, and a novel, *Les Microbes de la Société*.

MICHELET, KARL LUDWIG, a German philosopher and educator; born in Berlin, Dec. 4, 1801. In 1829 he became professor of philosophy in the University of Berlin. He made a specialty of Greek philosophy, and published an *Examen Critique de l'Ouvrage d'Aristote Intitulé "Métaphysique"* (1836), which was awarded a prize by the French Academy. His books on German philosophers include *Geschichte der Letzten Systeme der Philosophie in Deutschland* (1837); *Schelling und Hegel* (1839); and *Entwicklungsgeschichte der Neuesten Deutschen Philosophie* (1873). His own doctrine of Neo-Platonism, blended with modernized Christianity, he presented in *Persönlichkeit des Absoluten* (1844); *Der Historische Christus* (1847); *Die Zukunft der Menschheit* (1852); *Naturrecht oder Rechtsphilosophie* (2 vols., 1866.) He died in Berlin, Dec. 16, 1893.

MICHELSON, ALBERT ABRAHAM, an American physicist; born in Strelno, Poland, Dec. 19, 1852; graduated from Annapolis in 1873 and served in the navy until 1881. In that year he became professor of physics at the Case School of Applied Science, at Cleveland, Ohio; vice-president of the American Association for the Advancement of Science (1887). In 1892 he was appointed professor of physics in the University of Chicago. He made his mark through his series of investigations, in 1878-80, on the velocity of light, one of his most successful experiments fixing it at 186,305 miles a second. He wrote *The Relative Motion of the Earth and Luminiferous Ether* (1881); *Interference Phenomena in a New Form of Refractometer* (1882); *A Method for Determining the Rate of Tuning-Forks* (1883); *Velocity of Light in Carbon Disulphide* (1885); *On a Method for Making the Wave-Lengths of Sodium Light the Absolute and Practical Standard of Length* (1887); *The Application of Interference Methods to Astronomical Measurements* (1890); *The Broadening of Spectral Lines by Temperature and Pressure* (1894); etc.

MICHIE, PETER SMITH, an American engineer and educator; born in Brechin, Scotland, March 24, 1839; graduated from West Point (1863). He entered the engineer corps; served in the operations against Charleston, South Carolina (1863-64); against Richmond (1864); brevetted a brigadier-general of volunteers (Jan. 1, 1865); captain in 1865; on the staff of instructors at West Point (1867), and professor of natural and experimental philosophy (1871). He wrote *Wave-Motion Relating to Sound and Light* (1882); *Analytical Mechanics* (1886); *Hydromechanics* (1887); and *Life of General Upton*.

MICHIGAN, by the latest revised and corrected surveys, has an area of 58,915 square miles, of which



SEAL OF THE STATE OF MICHIGAN.

1,485 square miles are water surface. The population, according to the decennial census of 1890, was 2,093,889. The population in 1880 was 1,636,937; in 1884, a state census gave the number as 1,853,658; and in 1894 a similar count showed the number of inhabitants to be 2,241,454. The relative rank of Michigan among the states in 1890 was ninth, the same as in 1880; the density of population was 36.46 to the square mile, and 546,095 of the inhabitants lived in the twenty cities of the state, constituting 26.08 per cent of the entire population. There were 1,091,780 males and 1,002,109 females; the percentage of native-born citizens was 74.03; of foreign-born, 25.97; the number of negroes, 15,223, which was an increase of 123 since 1880.

The cereals are cultivated extensively in Michigan, 3,891,686 acres having been devoted to their

growth in 1889; of which area 25 per cent was in corn, 38 per cent in wheat and 27 per cent in oats. The rank of the state in area devoted to the cereals was fourteenth, in the total production twelfth, the number of bushels having been 95,954,009. The production of wheat to the acre was especially large, 1,500,000 acres yielding 24,771,171 bushels. The number of farms in Michigan in 1880 was 154,008, which had increased to 172,344 in 1890 and to 178,103 in 1894. The acres in farms increased almost one million between 1880 and 1890, and the acres of improved lands in farms over a million and a half. Nearly ten thousand more farms were cultivated by their owners in 1890 than were in 1880, and in the period between the two dates the value of the farms of the state increased more than fifty-seven million dollars, and the value of farm implements and machinery appreciated almost three millions, the value of live-stock almost fourteen millions. The number of horses was increased close upon two hundred thousand, oxen nearly twenty thousand, milch cows almost one hundred and fourteen thousand, swine over sixty thousand, and sheep two hundred and ten thousand. The increase in value of the live-stock for the decade was almost fourteen million dollars. The census returns of 1890 give the total value of the farms, fences, buildings, machinery and farm implements and live-stock at \$647,938,255; the number of horses, 516,117; the number of neat cattle, which included 497,617 milch cows, 1,046,771; the number of swine, 1,126,141; and the number of sheep, 2,400,318, from which were sheared 12,378,318 pounds of wool.

The chief agricultural industry is that of fruit-raising, the soil and climate being especially adapted to the culture of peaches. The peach belt is about two hundred miles in width, and extends across the state from east to west. Statistics gathered by the state authorities in 1894 show the number of peach trees on farms and in bearing to have been 2,704,253, the number of apple trees, 9,370,256, and the number of pear trees, 415,456. The same reports show that there were 4,832 acres in vineyards, and that the crop of the preceding year had sold for \$294,582. Grapes are grown in almost every county of the state, and numerous young vineyards not yet in bearing were found in all portions of the state bordering on Lake Michigan, which give promise of becoming prolific fruit-producing districts. Other small fruits, such as cherries, plums, and all kinds of berries grown in the latitude, are cultivated in all sections of the lower peninsula. The long coast line gives abundant facilities for shipping, and, in addition, there are almost seven thousand miles of railroad.

The second great industrial resource of the state is lumbering, which formerly held the first place. Forest fires and the wanton destruction of great bodies of timber have much decreased the output, which in 1889, according to the decennial census reports, amounted to \$83,000,000 for the manufactured products alone, in addition to which the timber products not manufactured amounted to \$9,637,663. Shipments are made by both rail and water to all parts of the United States, and the lumber output

of 1894 amounted to more than four billion feet, and two billion five hundred million shingles.

The manufacturing industries of Michigan are in excess of twelve thousand, the capital invested at the time of the taking of the eleventh decennial census amounting to more than \$262,000,000. The number of employees at that time was 163,941, to whom were paid \$66,347,798 in annual wages. The cost of the material used was estimated at \$154,521,918, from which there were manufactured products of the total value of \$277,896,706. As stated, lumber was the principal manufacturing industry, followed by flouring and grist-mill products of the value of \$22,778,829. Other industries were foundry and machine-shop products, yielding \$13,363,030; steam-railroad cars, \$11,078,281; furniture factory product, \$9,898,838; tobacco in various forms, \$8,955,015; iron and steel, \$5,829,843; carriages and wagons, \$5,699,941; and ship-building, \$4,710,108. Other industries that made returns above three million dollars were agricultural implements (almost four millions); chemicals; masonry, brick and stone; malt liquors; printing and publishing; slaughtering and meat-packing.

In the total value of mineral products Michigan stands second only to Pennsylvania. In iron ore the production was almost one half of the total amount mined in the United States, and the value of shipments \$15,588,369, out of a total of \$32,766,506. The expenditures at the mines were over \$12,000,000, while the total of all mines was but little in excess of \$24,000,000. There were employed, in the iron-ore mines, 13,120 men, to whom \$6,353,741 were paid as wages for the year. The Commissioner of Mineral Statistics of Michigan makes the following report in relation to shipments of iron ore in 1895: From the Marquette district there were sent out 2,095,166 tons; from the Menominee district, 1,694,804 tons; from the Gogebic district, 2,560,775 tons; the total from the Lake Superior district being 10,438,268 tons.

Michigan bears the distinction of being first in the production of salt, as it is in iron ore, and is second in copper. For forty-three years the state stood first in copper, but in 1887 gave way to Montana, which produces more copper, only in the way of incidental constituent of other ores, and not reduced. In 1895, fourteen Michigan mines produced 129,573,856 pounds of refined copper. The metal has decreased in value from 36¼ cents per pound in 1865 to 10¾ cents in 1895, at which price the product of the year amounted to \$13,929,189. The maximum output of coal was in 1882, when 135,339 tons were produced, but at no time since then has the output exceeded 81,500 tons, and in 1895 it had decreased to 50,764. Although gold has been known to exist in several localities in Michigan, it was not until within recent years that any systematic mining was attempted; and \$625,639 worth of the metal has been secured by the different mines. Silver has also been found in considerable quantities, and the value of the output from one mine, which also produces gold, was reported at \$56,035 for the past ten years. In addition to the precious metals there are large deposits of stone of various kinds, such as sandstone,

redstone, brownstone and grindstone, of which latter there was produced by one company, in 1895, 2,924 tons, of the value of \$23,000. Bushed grindstones and scythestones also brought \$18,842. Other deposits, which are not being worked to any great extent, but which are susceptible of producing almost unlimited quantities, are novaculite, slate, limestone, quartzite, kaolin, mica, peat, clay, granite, graphite, asbestos, gypsum and talc. Marble of many kinds, and of the best quality, is produced. Some is pure white, some variegated, shading from white to pink, green, gray and purple, and is susceptible of a polish almost equal to onyx. There are also deposits of serpentine, practically inexhaustible, which are of great value, for the reason that the only other known deposits are in Italy, where the supply is almost exhausted. The salt produced in 1895 amounted to 3,529,342 barrels. Although the territory in which salt is found embraces nine of the counties of the state, and the 110 companies now engaged in the manufacture of this staple have a combined capacity of 5,500,000 barrels annually, the reduced price has operated to keep the production at but little more than one half the capacity of the mills. The price has declined from \$1.80 per barrel in 1866 to 48½ cents in 1896, which latter price also includes the cost of the barrel, leaving no margin in the business, unless the manufacture is carried on in connection with the saw-mill business, so that the waste from the timber could be used as the fuel for the evaporation of the brine.

The report of the state treasurer for the fiscal year ending June 30, 1895, showed the disbursements to have been \$3,935,605; the total receipts, \$3,704,198. The balance remaining on hand was \$290,417. The railroads of the state paid in taxes the sum of \$836,049; the fire insurance companies, \$126,246, and the life insurance companies, \$78,740. At the date given, the bonded debt of the state amounted to \$10,992 and the trust fund debt to \$5,707,239.

The report of the commissioner of the banking department, of the date of Dec. 20, 1895, showed that there was deposited in the state banks \$66,263,139,—a gain of \$7,714,148 during the preceding year. The deposits in the national banks at the same date amounted to \$35,981,634,—an increase of almost \$1,000,000 over the same date the previous year, notwithstanding the loss of two banks within the time. The 169 state banks and four trust companies of the state had resources and liabilities to the amount of \$85,970,689, and in the 94 national banks the same items aggregated \$66,970,828.

The railroads of Michigan had 7,512.50 miles in operation in 1895, the total cost of which had been \$300,620,000. The 72 different lines reported the total receipts from operation for the preceding year at \$29,293,409, the operating expenses \$29,944,690, leaving a deficit of \$97,362.

The report of the superintendent of public instruction shows the number of children between the ages of five and twenty to be 696,234, of whom 468,979 attended the public schools of the state. The number of districts that maintained schools was 7,069; the number of graded school districts, 597.

There were 74 schoolhouses built of stone, 1,361 of brick, 5,987 of frame and 347 of log. The total value of the school property of the state was given as \$16,584,399. The number of male teachers employed was 3,479; of female, 12,711. To the former



STATE HOUSE, LANSING.

average monthly wages of \$48 were paid; to the latter, \$35.08. The total amount of teachers' salaries amounted to \$3,895,264. The total receipts for the year amounted to \$6,192,979; the total resources on hand to \$7,975,138.

Michigan has many institutions of higher education, among which are the University of Michigan, at Ann Arbor (q.v., in these Supplements); Albion College, at Albion (q.v., in these Supplements), controlled by the Methodist Episcopal Church; Adrian College, at Adrian, controlled by the Methodist Protestant Church; Alma College, at Alma, under the management of the Presbyterian Church; Battle Creek College, at Battle Creek, under the direction of the Seventh-Day Adventists; Benzonina College, at Benzonina, managed by the Congregational Church; Detroit College, at Detroit, managed by the Roman Catholic Church; Hillsdale College, at Hillsdale, controlled by the Free Baptists; Hope College, at Holland, controlled by the Reformed Church; Kalamazoo College, at the city of that name, controlled by the Baptist Church; and Olivet College, at Olivet, controlled by the Congregational Church.

In 1890 the religious organizations of Michigan numbered 4,798, with 3,761 edifices, 569,504 communicants or members, which constituted 27.20 per cent of the entire population. The value of all church property was \$18,682,971. The leading bodies were Adventists, 170 organizations; all Baptist bodies, 523; Roman Catholic, 406; Congregational, 331; Evangelical Association, 134; Lutheran Synodical Conference, 137; Lutheran Independent Synods, 164; all Lutheran bodies, 380; Methodist Episcopal, 1,085; all Methodist bodies, 1,578; Presbyterian, 236; all Presbyterian bodies, 252; Protestant Episcopal, 191; United Brethren, 302. The Roman Catholics led in the number of members and the value of church property.

The following table shows the charitable, correctional and penal institutions of Michigan, their location, average number of inmates and the cost of maintenance for the two years ending June 30, 1894:

INSTITUTION.	LOCATION.	AVERAGE NUMBER IN ATTENDANCE.	COST OF MAINTENANCE, TWO YEARS, ENDING JUNE 30, 1894.
Michigan Asylum for the Insane-----	Kalamazoo.	1,154	\$526,837
Eastern Michigan Asylum for Insane-----	Pontiac.	986	441,123
Northern Michigan Asylum for Insane-----	Traverse.	960	480,000
Michigan Asylum for Dangerous and Criminal Insane---	Ionia.	206	86,788
Upper Peninsula Asylum for the Insane-----	Newberry.	---	(*)
State Public School--	Coldwater.	220	-----
Michigan School for the Deaf-----	Flint.	315	145,000
Michigan School for the Blind-----	Lansing.	63	43,000
Michigan Home for the Feeble-minded and Epileptic-----	Lapeer.	---	(†)
Michigan State Prison	Jackson.	833	250,577
State House of Correction-----	Ionia.	471	266,064
State House of Correction and Branch of State Prison-----	Marquette.	120	56,000
Detroit House of Correction-----	Detroit.	611	-----
Industrial School for Boys-----	Lansing.	473	145,000
State Industrial Home for Girls-----	Adrian.	232	83,127
State School for Dependent and Neglected Children---	Coldwater.	325	105,000

The National Guard of Michigan is composed of five regiments of infantry, composed of 40 companies, and comprises 192 commissioned officers and 2,704 enlisted men, a total strength of 2,896. In 1894 there was organized a naval brigade, four officers commissioned, and the division located at Detroit.

Jan. 1, 1896, there were 736 newspapers of all kinds published in Michigan. Papers were published in 82 of the 84 counties of the state, in 349 of the cities, towns and villages, and in 81 of the county seats. Of the whole number of papers, 66 were daily, 1 triweekly, 12 semiweekly, 570 weekly, 7 semimonthly, 56 monthly, and 4 quarterly.

The following are the principal cities of Michigan, with the population as given in the state census of 1894: Alpena, 12,139; Ann Arbor, 11,000; Battle Creek, 15,522; Bay City, 30,039; Detroit, 237,837; Flint, 10,420; Grand Rapids, 79,424; Ishpeming, 11,687; Jackson, 22,614; Kalamazoo, 21,053; Lansing, 15,847; Manistee, 13,449; Menominee, 12,532; Muskegon, 20,222; Port Huron, 18,140; Saginaw, 44,642; and West Bay City, 12,337.

The following is a list of the governors of Michigan since 1836, the date of the admission of the state into the Union: Steven T. Mason, 1836-40; William Woodbridge, 1840-41; James W. Gordon, 1841-42; John S. Barry, 1842-46; Alpheus Felch, 1846-47; William L. Greenley, 1847-48; Epaphroditus Ransom, 1848-50; John S. Barry, 1850-52; Robert McClellan, 1852-53; Andrew Parsons,

(*) Under course of construction. Appropriation made in 1893.

(†) Completed, August, 1895, and opened for inmates.

1853-55; Kingsley S. Bingham, 1855-59; Moses Wisner, 1859-61; Austin Blair, 1861-65; Henry H. Crapo, 1865-69; Henry P. Baldwin, 1869-73; John J. Bagley, 1873-77; Charles M. Crosswell, 1877-81; David H. Jerome, 1881-83; Josiah W. Begole, 1883-85; Russell A. Alger, 1885-87; Cyrus G. Luce, 1887-91; Edwin B. Winans, 1891-93; John T. Rich, 1893-97; Hazen S. Pingree, 1897. See also MICHIGAN, Vol. XVI, pp. 237-241.

MICHIGAN, LAKE, the second in size, and the only one lying wholly within the United States, of the great fresh-water lakes. See also ST. LAWRENCE, Vol. XXI, p. 178.

MICHIGAN, UNIVERSITY OF, an institution of learning situated at Ann Arbor, Michigan. In



LIBRARY, UNIVERSITY OF MICHIGAN.

1826 Congress set apart two townships in the territory of Michigan for the purpose of founding a university, which was done March 18, 1837. The university was opened Sept. 20, 1842, as a non-sectarian institution for both sexes. A medical department was added in 1850, a law department in 1859, and a homœopathic medical college in 1875. There is also a dental college and a special two years' course in chemistry. Degrees are conferred on the completion of the courses in the classical, philosophical, scientific, medical, law and engineering departments. Selected studies may be pursued for any period not less than one term, while there are post-graduate courses. Each department has its own faculty and is under its own management. All the faculties, comprising over 50 professors (exclusive of 120 additional instructors), constitute the university senate. The number of students averages about 3,000. The library contains 100,000 volumes. The astronomical and meteorological observatories are famed. The various laboratories are excellently equipped, while the numerous museums are well filled. In the department of art the collection is one of the finest in the United States, having been recently enriched by the Coldwater collection. The grounds cover 55 acres. University Hall has a frontage of 347 feet, and is surmounted by a dome rising 140 feet from the ground. The buildings were erected at a total cost of \$700,000. The proceeds from the sale of lands donated by Congress made a fund of \$543,000. The institution receives an annual grant from the state derived from a sixth-of-a-mill tax levied on the taxable property of the state. The total annual income, including fees, etc., amounted to (1895) \$445,805. The university is under the control of a board of eight regents, elected

by the popular vote of the state. The regents serve for a term of eight years; elections are held biennially for two regents, two retiring every two years. The president of the university is, *ex officio*, a member and president of the board of regents. The first president was appointed in 1852.

MICHIGAN CITY, a city of Indiana. Four planing-mills and lumber-yards, four chair factories, refrigerator-works, and car-works are among the leading manufactures. It has a national bank with a capital of \$250,000, a United States life-saving station, a sanatorium, a beautiful public park, St. Marie's Academy (Roman Catholic) and various other parochial schools, and has an electric street-railway. Population 1890, 10,776. See also MICHIGAN CITY, Vol. XVI, p. 241.

MICHIPICOTEN, a river, bay and island of Ontario, Canada. The river rises near lat. 48° 20' N., long. 84° W., within a mile or so of the sources of the Moose River, with which it forms a boat route from Lake Superior to Hudson Bay. It flows southwest into Michipicoten Bay, a large V-shaped indentation of the northeastern coast of Lake Superior. Forty-five miles E.S.E. of the mouth of the river lies Michipicoten Island, 25 miles long and 10 wide, rather high (800 feet above the lake), and cut by numerous inlets. It has a few inhabitants, engaged mostly in mining copper, of which there are enormous deposits here.

MICHOACAN, a state of central Mexico, lying, for the most part, inland, but having some sea-coast. Its western part is crossed by the Sierra Madre, the northern part by the Cordillera de Anahuac. The highest peak is Tancitaro, 11,500 feet in altitude. The central and coast regions are rolling and plain lands, which are fertile and salubrious. It is drained by the Lerma and the Mescalapa rivers. The principal products are maize, coffee, sugar-cane, cotton and cattle, while gold, silver and copper are mined. Area, 23,703; population 1893, 830,923.

MICMACS, a tribe of Algonquin Indians, among the first with whom the English came in contact. They remained hostile to the English and their colonies till 1760. They now number from 3,000 to 4,000, and are mostly in Nova Scotia, Newfoundland and New Brunswick. There is an *English-Micmac Dictionary* (Halifax, 1888).

MICROCOCCHI. See SCHIZOMYCETES, Vol. XXI, pp. 401-404; and BACTERIOLOGY and SURGERY, AMERICAN, in these Supplements.

MICROPHONE. See TELEPHONE, Vol. XXIII, pp. 129-132.

MICROPYLE. See BOTANY, Vol. IV, p. 145.

MICROSCOPY, THE ELECTRIC LIGHT IN. The incandescent electric light is recommended very highly as a substitute for the usual lamps used in microscopy, or even for the direct daylight. A small lamp, which requires only one cell of a bichromate battery to operate it, and which can be adjusted to any position, is now made for this purpose. Among the advantages of the electric light are its intensity, which allows the use of very oblique rays in illuminating the object; the larger proportion of white and blue rays in the light, which bring out

the finer details more clearly; the small amount of heat given out, which enables the lamp to be placed as close to the condenser of the microscope as may be desired; and for certain lines of investigation, the doing away with the necessity of a mirror to reflect the light upon the object, since the lamp can be placed in any desired position in reference to it. It is also claimed that the light is less fatiguing to the eye than even ordinary daylight, while for purposes of microphotography the large proportion of actinic rays in the electric light and the ease with which it can be regulated render it far superior to any other illuminant.

MICROSPORANGIUM, a name used in heterosporous plants to indicate the sporangium or spore-case which contains the microspores. As the pollen-grains of seed-plants are microspores, the anther-sacs are microsporangia.

MICROSPORE, a name used in heterosporous plants to indicate the spore which develops the male gametophyte or prothallium, as distinguished from the macrospore which develops the female gametophyte. Pollen-grains are examples of microspores.

MICROTASIMETER, an instrument invented by Thomas A. Edison for the measurement of very minute expansion, or of pressure resulting from expansion. It is based on the well-known property of carbon, which receives greatly increased electric conductivity when subjected to pressure. The apparatus consists of a rigid iron frame having an upright at each end. In one end is a carbon button mounted between two platinum surfaces. The article to be tested is placed between the uprights, with one end resting against the carbon button, which is connected electrically with a galvanometer. Any expansion of the substance tested which ensues upon the application of heat is made manifest at once by the galvanometer, whose pointer indicates the degree of increased conductivity of the carbon, thus measuring the pressure. So delicate is this instrument that the heat of the hand, when held at a short-time distance from the substance tested, is very shortly manifest in the action of the galvanometer.

C. H. COCHRANE.

MICROTOME, an instrument for cutting thin sections of portions of plants and animals. See also **ZOOLOGY**, Vol. XXIV, p. 816.

MIDDLEBORO, a village of Plymouth County, southeastern Massachusetts, nine miles E. of Taunton, on the New York, New Haven and Hartford railroad. Its principal industries are the manufacture of boots and shoes, straw goods and lumbering and farming. It has a national bank, a public library with 7,000 volumes, and several schools. Population of village 1895, 1,860; of town, 6,689.

MIDDLEBURY, a post village and the capital of Addison County, central western Vermont, 34 miles S.W. of Montpelier, on Otter Creek, and on the Central Vermont railroad. It is the seat of Middlebury College, a co-educational, non-sectarian school founded in 1800, which in 1896

had 10 instructors, 105 students and a library of 18,000 volumes. It has marble-quarries, good water-power, and manufactures flour, woolens, cotton, paper, leather, sashes and doors. Population 1890, 1,762.

MIDDLEPORT, a village of Niagara County, northwestern New York, on the New York Central and Hudson River railroad, and on the Erie canal. It is in a fruit-raising section, and manufactures furniture, flour, lumber, paper and iron castings, and has fruit canning and evaporating works, a creamery, dry-docks and shipyard. Population 1890, 1,217.

MIDDLEPORT, a post village of Meigs County, southeastern Ohio, on the Ohio River, two miles below Pomeroy, and on the Kanawha and Michigan railroad. It is in an agricultural and coal mining region, and has manufactories of iron salt, carriages, woolen goods and furniture. It has a large trade, banks and several newspapers. Population 1890, 3,211.

MIDDLETON, ARTHUR, a signer of the Declaration of Independence; born at Middleton Place, Ashley River, South Carolina, June 26 1742; graduated from the University of Cambridge, England; traveled through Europe and returned home in 1763. In 1775 he was sent to the Provincial Congress, and the following year was a delegate to the Continental Congress, where he signed the Declaration of Independence. In 1780 he was active in the defense of Charleston, South Carolina, and after the fall of that city was for some time held as a prisoner of war. After his exchange he served in Congress until the close of the war. Later he was a state senator. He wrote, in terse English, a number of political and literary essays, published under the name of "Andrew Marvell." He died at Goose Creek, South Carolina, Jan. 1, 1787.

MIDDLETON, JOHN HENRY, an English educator and art critic; born in York, England, in 1846; graduated from Oxford, and was Slade professor of fine art in the University of Cambridge for several years after 1866, and a lecturer at the Royal Academy, London. At the time of his death, in June, 1896, he was art director at the South Kensington Museum; author of *Ancient Rome* (1888); *The Engraved Gems of Classical Time* (1891); *Illuminated Manuscripts in Classical and Medieval Times* (1892). He prepared a number of monographs for this **ENCYCLOPEDIA**, including **POTTERY AND PORCELAIN**; **ROME: ITS TOPOGRAPHY AND ARCHAEOLOGY**; and **SCHOOLS OF PAINTING**; and wrote many articles for artistic and antiquarian periodicals.

MIDDLETOWN, a city of Connecticut. It has regular daily steamboat connection with New York and Hartford. It has five libraries, aggregating 75,000 volumes, national and savings banks, and good public schools. Wesleyan University (q.v., in these Supplements) is located here. Population 1890, 9,013. See also **MIDDLETOWN**, Vol. XVI, pp. 283, 284.

MIDDLETOWN, a town of Newcastle County, northern Delaware, 22 miles S. of Wilmington, on

the Philadelphia, Wilmington and Baltimore railroad. It is a great peach-shipping depot, and contains fruit-preserving establishments, carriage, farm-tool and harness factories. Population 1890, 1,454.

MIDDLETOWN, a city of southeastern New York. It became a city in 1888. It has two libraries and two national banks, with \$260,000 capital. Population 1890, 11,977. See also MIDDLETOWN, Vol. XVI, p. 284.

MIDDLETOWN, a city and railroad center of Butler County, southwestern Ohio, 32 miles N. of Cincinnati, on the Cincinnati, Hamilton and Dayton, and the Cleveland, Cincinnati, Chicago and St. Louis and two other railroads. It contains seven paper-mills, tobacco factories, flouring-mills, foundry, a paper-bag and scissors factory, and has two national banks, with \$550,000 capital. Population 1890, 7,681.

MIDDLETOWN, a post borough of Dauphin County, southeastern Pennsylvania, nine miles S.E. of Harrisburg, at the junction of Swatara Creek and the Susquehanna River, on the Union canal, and on the Pennsylvania and the Philadelphia and Reading railroads. It is in a lumbering and farming district, and is noted for its lumber trade and iron business. It contains the American Tube and Iron Works, Susquehanna Iron Works, Middletown Car Works, Cameron Iron Furnaces, a furniture factory, paint and chemical works, stove-works, and saw and planing-mills. It is the seat of the Frey Orphan School, and has banks, water, gas and electric lights, electric railways, and in the vicinity are limestone and brown sandstone quarries. Population 1890, 5,080.

MIDGE. See WHEAT, Vol. XXIV, p. 535.

MIDLAND, a city and the capital of Midland County, central Michigan, 19 miles W. of Bay City, on the Chippewa River, and on the Flint and Pere Marquette and the Michigan Central railroads. It is in a pine-timber section, and produces lumber, shingles, hoops, pails, tubs, salt and bromine. Population 1890, 2,277; 1894, 2,484.

MIDLOTHIAN. See EDINBURGH, COUNTY OF, Vol. VII, p. 656.

MIDWAY, a town of Woodford County, northern central Kentucky, 10 miles E. of Frankfort, on the Louisville and Nashville and the Southern railroads. It is in the blue-grass region, and ships grain and tobacco, raises thoroughbred horses and cattle, and has the Kentucky Female Orphan School, banks and newspapers. Population 1890, 1,185.

MIFFLIN, THOMAS, an American soldier; was born in Philadelphia, Pennsylvania, of a Quaker family, in 1744. He graduated from Philadelphia College in 1760; and after traveling in Europe, in partnership with his brother he became a merchant. He was in the Pennsylvania legislature in 1772-73, and in 1774 was a delegate to the Continental Congress. When the news of the fight at Lexington became known he was made major of one of the first regiments organized, thus

severing his connection with the Quakers, and shortly afterward Washington chose him as his first aide-de-camp. In 1775 he was made quartermaster-general, in 1776 brigadier-general, and in 1777 major-general, after a recruiting tour through Pennsylvania, during which his fiery eloquence caused thousands to enlist. Afterward he was connected with the Conway cabal, which attempted to have Washington, whom they deemed too Fabian in his tactics, dismissed from the supreme command. Soon, however, Mifflin's services were again in demand, and himself as much a *persona grata* as ever in the general-in-chief's eyes. In 1783 he became a member of Congress, and in 1785 was speaker of the Pennsylvania legislature. In 1787 he was a delegate to the convention that framed the United States constitution, and from 1788 to 1790 was a member of the supreme executive council of Pennsylvania. From 1790 to 1799 he was governor of the state, and until his death, which occurred in Lancaster, Pennsylvania, Jan. 20, 1800, was a member of the assembly.

MIFFLINBURG, a post-borough of Union County, central Pennsylvania, nine miles W. of Lewisburg, on the Pennsylvania railroad. It is in a fertile farming and limestone, iron-ore and lumber-producing region, has manufactories of flour and lumber, carriages, sleighs and buggies, and has oil-refineries. Population 1890, 1,417.

MIGNE, JACQUES PAUL, a French Roman Catholic clergyman; born in St. Flour, France, Oct. 25, 1800. He was educated at the seminary at Orleans; ordained priest in 1824, and served some time as curate at Puiseaux, in the diocese of Orleans. A difference with his bishop about a book on the liberty of the priests took him to Paris in 1833, where he started the ultramontane daily, *L'Univers*. In 1836 he sold the paper, and set up a publishing house at Petit Montrouge, near Paris, which issued numerous works of theology by leading members of the French clergy. He died in Paris, Oct. 25, 1875.

MIGNET, FRANÇOIS AUGUSTE MARIE, a French historian; born in Aix, in Provence, May 8, 1796. He graduated from the Avignon Lyceum, and then studied law at Aix with Thiers, whose life-friend he became. In 1821 he went to Paris, and began to write for the *Courrier Français*, and to lecture on modern history at the Athénée. In the spring of 1824 appeared his *Histoire de la Révolution Française*, a short, lucid and impartial record of this great period. Mignet joined the staff of the *National*, and with Thiers signed the famous protest of the journalists on July 25, 1830. After the revolution of 1830 he became keeper of the archives at the Foreign Office, but lost this office in 1848. In 1833 he went on a confidential mission to Spain, and used the opportunity to explore the famous Salamanca archives. He was elected to the Institute of France in 1832, and to a chair among the Forty in 1836. Mignet persistently declined to accept, from his friends in power, or from the electors, any office of a political nature. His whole life was wedded to his his-

torical labors. He wrote *History of Mary Stuart* (1851); *The Abdication of Charles V* (1854); *Life of Franklin* (1848); *Antonio Perez and Philip II* (1845); *Historic Eulogies* (1864). He died in Paris, March 24, 1884.

MIGRAINE. See NEURALGIA, Vol. XVII, p. 364.

MIKADO. See JAPAN, Vol. XIII, pp. 582–584.

MIKLOSICH, FRANZ VON, a Slavic scholar and philologist; born in Lutzenburg, Styria, Nov. 20, 1813. After studying law at the University of Gratz, he went, in 1838, to Vienna to practice as an advocate, but was led by Kopitar to the study of philology, and in 1844 obtained a post in the Imperial Library. From 1850 to 1885 he was professor of Slavic philology at Vienna, in 1851 being elected to the Academy of Sciences, made a life-member of the Reichsrath in 1862, and created a knight in 1868. He wrote *Vergleichende Grammatik der Slavischen Sprachen* (4 vols., 1852–74); *Etymologisches Wörterbuch der Slavischen Sprachen* (1886), the accepted authority on the subject. He died in Vienna, March 7, 1891.

MIKLUCHO-MACLAY, NICHOLAS DE, a Russian traveler and naturalist; born in Ukraine, Russia, in 1846. He studied in Germany in 1865–67; visited Morocco and the Canary Islands in 1867; the Red Sea and Asia Minor in 1869; between 1871 and 1883 spent eight years in New Guinea; traveled also through the Malay Peninsula, the Caroline and Admiralty Islands and East Malanesia. Most of his narratives of travel were published by the St. Petersburg Imperial Geographical Society and in the Dutch *Nat. Tijdschrift*, a Batavian periodical. They embraced discoveries of his in the field of geography, anthropology, linguistics, zoology and botany. He was earnest, fearless and well versed in the branches to which he devoted himself. He died April 15, 1888.

MILAN, a town and the capital of Sullivan County, central northern Missouri, 250 miles N.W. of St. Louis, on the Chicago, Burlington and Kansas City and the St. Louis, Omaha and Kansas City railroads. It is in a fruit-raising region, and has deposits of fire-clay, mineral paint, building-stone and coal, and contains a woolen-mill, flour-mills, brickyards and cooperage. It is a shipping-point for cattle, grain and hogs. Population 1890, 1,234.

MILAN, a city of Gibson County, northwestern Tennessee, 90 miles N.E. of Memphis, on the Louisville and Nashville and the Illinois Central railroads. It has cotton, saw and planing mills, a barrel factory and a fruit-canning establishment, a high school and a college. Population 1890, 1,546.

MILAN OBRENOVITCH I, a king of Servia, second cousin of Prince Michel Obrenovitch III, who was assassinated in 1868; born Aug. 10, 1854, at Jassy. After the close of the Russo-Turkish war the complete independence of Servia was recognized, and its boundaries defined by the treaty of Berlin, July 13, 1878. Prince Milan mar-

ried, Oct. 18, 1875, Nataie, daughter of the Russian Colonel Keschko, by his wife Pulcheria, Princess Stourdza. Servia was proclaimed a kingdom under King Milan I on March 6, 1882. In 1885 King Milan declared war upon Prince Alexander of Bulgaria, on the ground of the union of Bulgaria and Eastern Roumelia. His army had some success at first, but within a fortnight was driven back, defeated and crushed, within the Servian frontier. Milan, whose private life was of the worst, was divorced from his wife in 1888. They were reconciled *pro forma* in 1893. The Queen was always enthusiastically pro-Russian, and took no pains to hide her preferences. Finally, in March, 1889, King Milan was compelled to abdicate, which he did, in favor of his son, Alexander Obrenovitch, born Aug. 14, 1876, who, in April, 1893, overturned the regency and declared himself of age. See also SERVIA, Vol. XXI, p. 689.

MILBANK, a city and the capital of Grant County, northeastern South Dakota, 117 miles N. of Sioux Falls, on the Wetstone River, and on the Chicago, Milwaukee and St. Paul railroad. It is in a grain and stock raising region, and has carshops and a roundhouse of the railroad, flour and feed mills, and four grain-elevators. Population 1890, 1,207; 1895, 914.

MILBURN, WILLIAM HENRY, an American clergyman; born in Philadelphia, Sept. 26, 1823. When a boy, although of defective sight, he studied at Illinois College; at the age of twenty became a Methodist preacher; in 1859 went to England and lectured with success; on his return was ordained in the Protestant Episcopal Church, but in 1872 returned to Methodism. He was repeatedly chaplain to Congress. He wrote *Rifle, Axe and Saddle-Bags* (1857); *Ten Years of Preacher-Life* (1859); and *Pioneers and People of the Mississippi Valley* (1860).



REV. W. H. MILBURN.

MILE, a measure of distance taking its name from the Latin *mille passuum*, "a thousand paces." The present English and American statute mile was fixed by Queen Elizabeth at 5,280 feet. Compared with it there is given below the length of the different measures of distance called miles in various times and countries.

English and American (U. S.) statute mile	-----= 1
Old Roman mile	-----= .9193
Geographical (or nautical) mile, or admiralty knot	-----= 1.153
Scotch mile	-----= 1.123
Irish mile	-----= 1.273
German mile (exactly four nautical miles)	-----= 4.611
German long mile	-----= 5.753
German short mile	-----= 3.897
Prussian mile	-----= 4.680
Danish	-----= 4.684
Swedish	-----= 6.648
Welsh mile	-----= about 4 English miles

MILES, NELSON APPLETON, an American soldier; born at Westminster, Massachusetts, Aug.



GENERAL NELSON A. MILES.

8, 1839. He came of an old colonial family, was educated in his native village and in Boston, and on the outbreak of the Civil War he was one of the first to raise a company of volunteers in defense of the Union. Commissioned a lieutenant in the Twenty-second Massachusetts Regiment, his military abilities met with speedy recognition.

In May, 1862, he was promoted to lieutenant-colonel and transferred to the Sixty-first New York Regiment. Before September passed, he was colonel commanding the regiment. He took a gallant part in the battles of Williamsburg, Seven Pines or Fair Oaks (where he was wounded), Gaines's Mills, Savage Station, White Oak Swamp, Nelson's Farm and Malvern Hill. He was seriously wounded at Fredericksburg, Dec. 13, 1862, and was left for dead at Chancellorsville. Of magnificent physique, he astonished the surgeons by reporting for duty in the autumn of 1863, and took part in the campaign of 1864, from the Wilderness to Petersburg and Richmond, serving in the final campaign of 1865. The inception of negotiations for Lee's surrender began in front of his lines near Appomattox, and only by the mere chance of Lee's riding in a different direction to wait for General Grant was it that the surrender took place where it did, instead of in front of General Miles's brigade. He had been promoted brigadier-general in May, 1864, in August brevetted major-general, and in 1865 appointed a major-general of volunteers. With peace and a reorganization of the army he became a colonel and brevet major-general, and in 1869 commanded the Fifth Infantry. He saw much Indian-fighting on the border, and was one of the moving factors in the winning of the West. He commanded the United States troops in Chicago in the railroad strike of 1894, and averted much bloodshed by his able disposition of his forces. Promotion took him to the East, and in 1896 he became the general commanding the American army. His *Personal Recollections* (1896) is a graphic story of a life spent in his country's service, wherein his literary ability shines beside the masterly work of Frederic Remington's battle scenes and Indian pictures.

MILES CITY, a village and the capital of Custer County, southeastern Montana, 295 miles E. of Helena, on the Yellowstone River, and on the Northern Pacific railroad. It is the center of the cattle district of eastern Montana, and has steam-boat traffic on the river. Population 1890, 956.

MILFORD, a town and seaport of New Haven County, central southern Connecticut, 10 miles S.W. of New Haven, on Long Island Sound, at the mouth of the Wopewaung River, and on the New

York, New Haven and Hartford railroad. It manufactures straw goods, shoes, fish-oil, bone fertilizers, and has oyster-beds. It contains Elmwood School for Boys, a lyceum and library, and a soldiers' monument. The river is spanned by a granite bridge. Population 1890, 3,811.

MILFORD, a town of Kent County, Delaware, 18 miles S.S.E. of Dover, on the Philadelphia, Wilmington and Baltimore railroad, and on Mispillion River. It is a shipping-point for farm and orchard produce, fruit raising and preserving being the principal industry. It has public schools and a preparatory school. Population 1890, 1,226.

MILFORD, a town of Worcester County, Massachusetts, 17 miles S.W. of Worcester, on the Boston and Albany, the Grafton and Upton and the New England railroads. Principal industries the manufacture of shoes and straw goods, and granite-quarrying. It has two national banks, and a public library containing 9,772 volumes. Population 1890, 8,780; 1895, 8,959.

MILFORD, a post village of Oakland County, southeastern Michigan, 35 miles NW. of Detroit, on the Huron River, and on the Flint and Pere Marquette railroad. It is in an agricultural region and has a foundry and several door-knob, farm-tool and other manufactories. Population 1890, 1,138; 1894, 1,226.

MILFORD, a town of Hillsboro County, central southern New Hampshire, on the Boston and Maine and the Fitchburg railroads, and on Stony River, 50 miles N. of Boston, to which city it ships 220,000 gallons of milk annually. It has factories of picture and mirror frames, tassels, furniture, men's boots and shoes, and knitting-cotton. Here are granite-quarries. It has a public library, a national bank with a capital of \$100,000, and is popular as a summer resort. Population 1890, 3,014.

MILITARY ACADEMY OF THE UNITED STATES, THE. The history of the Military Academy at West Point dates from the close of the Revolutionary War. Washington, Knox and other leaders urged the organization of an institution where officers might learn the art of war, as the surest way of preserving the exercise of the arts of peace. In 1794, Congress authorized the enrollment of a corps of artilleryists and engineers to permanently garrison the forts at



BATTLE MONUMENT, WEST POINT.

West Point, and it also provided for the attachment of 32 students or cadets to this force. This was the birth of the Military Academy. Four years later the corps was enlarged, instructors in arts and sciences were appointed, and a cadet was given definitive military rank, superior in grade to a sergeant, but inferior to the ensign, who is now termed a second lieutenant. The cadets became

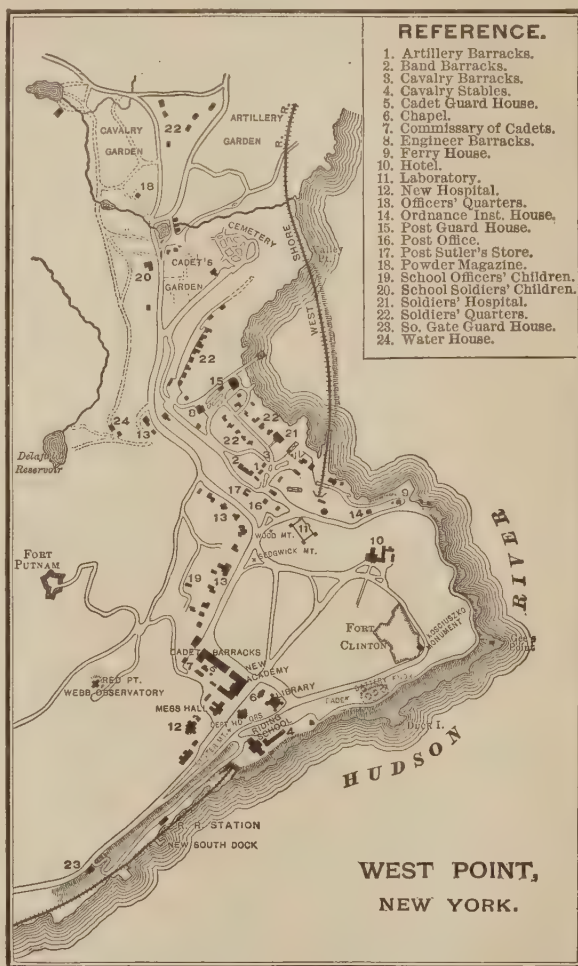
part and parcel of the American army, and subject to its laws and regulations, the same as other commissioned officers. Formerly, they were enlisted for five years, but the period was extended to eight, so that the United States could claim their services for four years after graduation, but without a corresponding liability to regularly commission every graduate. Step by step the academy was enlarged, until in 1812 it had 260 students and took somewhat of its present form. The first superintendent was General Jonathan Williams, one of his professors being F. R. Hassler, afterward famous for his work in the Coast Survey. In 1817, Colonel Sylvanus Thayer, the "Father of the Academy," took command, and introduced the present uniform, organization and rules of study. Resigning in 1833, he was succeeded by other distinguished officers, among whom was Gen. (then Colonel) R. E. Lee, whose defection to the Confederate service was followed by 56 out of 278 cadets. Of 1,249 living graduates at the beginning of the Civil War, 919 remained loyal, 283 enlisted in the Confederate Army, and 47 were either neutral or their addresses were unknown.

The commandant and officers detailed to the post at the present day serve only four years, while the professors, with the assimilated rank of lieutenant-colonel or colonel, after ten years' service are appointed for life, or rather during satisfactory service. The academic staff is divided into 11 departments: Natural and experimental philosophy; drawing; mathematics; chemistry, mineralogy and geology; history, geography and ethics; civil and military engineering; law; tactics; modern languages; practical military engineering; and ordnance and gunnery. A fencing-master, teacher of music, and dancing-master complete the staff.

The cadets are formed into a battalion of four

infantry companies, each commanded by a regular officer of infantry detailed for the purpose, and officered, under him, by cadets from the upper classes. A cadet adjutant ranks next to the four cadet captains. The various buildings occupied for the purposes of the Military Academy are picturesquely grouped around the wooded slopes of the post. The Riding School is the first encountered by a visitor landing from a steamboat or arriving by railroad. Near by are the stables with quarters for 100 horses. Facing the river is

Grant Hall, or Mess Hall, as it is more familiarly known. The building contains a collection of fine portraits of famous American soldiers. Near by are the Hospital and Administration Buildings, the latter the post headquarters. Then comes the Plain, an open, level area of some forty acres. On the right is a dusty expanse, where field-pieces are packed under canvas covers, and where the mounted drills of cavalry troops and the light-battery take place. At the left is the campus of the Academy and parade of the post. Here the infantry battalion drills and dress-parades occur. The Chapel, a stone building with a Greek portico, was built in 1836, and the Reformed Episcopal form of worship is conducted there by the post chaplain. It is small and old-fashioned, and peculiarly adorned. The most interesting objects are the cases of cap-



tured flags. Among the trees is the camp-ground of the cadets, where they live in tents from graduation day in June until September. Beyond this shady camp-ground rises the grassy parapet of Fort Clinton. The present fortification was made in 1857, and is an object lesson in the science of field fortification. The battalion is quartered in a great quadrangular, castellated structure of Tudor architecture, the four stories of which contain 176 rooms. It was completed in 1849, the Academic building in 1893, and these, with Grant or

Mess Hall, are the principal buildings on the post, (See also WEST POINT, in these Supplements).



CADETS' QUARTERS, MILITARY ACADEMY.

Cadet Appointments. Each Congressional district and territory—also the District of Columbia—is entitled to have one cadet at the academy, the cadet to be named by the Representative in Congress. There are also ten appointments at large, specially conferred by the President of the United States. The number of students is thus limited to 367. Appointments are usually made one year in advance of date of admission, and may be made either after competitive examination or given direct, at the option of the Representative. The Congressman, should he desire, may nominate a legally qualified alternate, who will be examined with the regular nominee and admitted in the event of his success and the latter's failure to pass the prescribed preliminary examinations.

Appointees to the Military Academy must be between 17 and 22 years of age, free from any infirmity, and able to pass a careful examination in reading, writing, orthography, arithmetic, grammar, geography, and history of the United States.

About one fourth of those appointed usually fail to pass the preliminary examination, and but little over one half the remainder finally graduate.

The discipline is very strict, even more so than in the army, and the enforcement of penalties for offenses is inflexible rather than severe. Academic duties commence September 1st and continue until June 1st. Examinations are held in January and June, and cadets found proficient in studies and correct in conduct are given the standing in their class to which their merits entitle them, while those deficient either in conduct or studies are discharged. At the end of the second and fourth years a furlough is granted to a cadet, for the purpose of a visit home.

From about the middle of June to the end of August cadets live in camp, engaged only in military duties and receiving practical military instruction.

The number of students at the academy is usually about three hundred.

Upon graduating, cadets are commissioned as second lieutenants in the United States army. The pay of a cadet is \$540 a year, out of which his mess, uniform and other personal expenses are defrayed.

Public attention has frequently been drawn to the practice of hazing newcomers in vogue at the academy, or to use a cadet euphemism, "the reduction of a plebe to his proper level of absolute insignificance." Allowing for natural coloring to such stories, the fact remains, that owing to the firm stand taken by President Cleveland in refusing to reinstate cadets dismissed for cruelty to their juniors, the practice of hazing is far from frequent, and, when detected, certain to meet with severe punishment.

A few details as to post-graduate instruction are appropriate. In order to add a special professional training for the graduates of the Military Academy, and also to give the needed opportunity for full technical instruction to those who have received their commissions from civil life or from the ranks of the army, post-graduate schools have been opened at Fortress Monroe, Virginia; Fort Leavenworth, Kansas; Willet's Point, New York; and Fort Riley, Kansas. These schools are also maintained by the United States government. The school at Fortress Monroe, Virginia, was commenced in 1867. It has a two years' course. It is intended for subalterns of artillery, yet officers of other arms of the service have, by special permission of the Secretary of War, been educated there. The school at Fort Leavenworth, Kansas, began in 1882. It is designed for the training of infantry and cavalry officers. The school at Willet's Point, New York, was established in 1865. It is intended for the education of officers of the engineer and artillery corps. The course covers two years. Special attention is given to permanent works; their construction and management; also to torpedoes and to the electrical service. The school at Fort Riley is devoted to the light artillery and cavalry branches of the service.

MILITARY COLLEGES AND SCHOOLS.

The most notable military school maintained by a state is the Virginia Military Institute. It ranks next to the United States Academy. This school is located at Lexington, Virginia. It has eight professors, and is modeled after the West Point school in its general plan, instruction and discipline, but its diplomas confer no military titles. It has usually about 150 students.

The Kentucky Military Institute is similar. It has existed since 1846, being located first at Frankfort, and now at Farmdale, Kentucky. It has 11 professors, and instructs usually about 130 students. There are a number of other military schools, especially in the Southern states; some are also maintained privately in New York, Massachusetts, Vermont, Pennsylvania, Ohio and Michigan.

Since 1883 the general government details forty commissioned officers of the army to act as professors of military science and tactics at certain designated academies and colleges, some of which have accepted from the United States certain grants of land for educational purposes. It has been stipulated in the grants, and made obligatory upon each institution so helped, that military training should be included in its course of studies. The above-named army officers are distributed among the several states, as nearly as possible according to the population. Recently, however, state institutions which introduce a military branch of instruction are preferred in the distribution of these military instructors. The number of students over 15 years of age attending these institutions is about 8,000. Of this number, about 4,000, or 50 per cent, attend infantry drill.

MILITARY ORDER OF FOREIGN WARS. See COLONIAL SOCIETIES, in these Supplements.

MILITARY ORDERS. See MONACHISM, Vol. XVI, p. 709.

MILITIA (from Latin *miles*, "a soldier") has now the acquired meaning of the domestic force organized for the defense of a nation, as distinguished from the regular army, which can be employed at home or abroad, in either defensive or aggressive operations. Under its military law every nation has a reserve upon which its defense would fall in case of insufficiency on the part of the regular army; but the system differs in each country, and, with the exception perhaps of the United States during peace, none is formed after the model of the British militia (q.v., Vol. XVI, pp. 299-301).

The constitution of the United States (art. I, sec. 8, declares: The Congress shall have power To provide for calling forth the militia to execute the laws of the Union, suppress insurrections and repel invasions. 16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states, respectively, the appointment of the officers and the authority of training the militia according to the discipline prescribed by Congress."

In article II, section 2, we read: "1. The President shall be commander-in-chief of the army and navy of the United States, and of the militia of the several states when called into the actual service of the United States."

The second amendment to the constitution is worded as follows: "A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed."

Congressional enactments require the enrollment, in each state, of all non-exempted, able-bodied male citizens between the ages of 18 and 45, and establish the rules of their organization and the system of their discipline. The fact is however, that this organization, etc., is only prospective, having never been practically realized, except in so far as the Federal government appropriates yearly about \$400,000 toward the National Guard or volunteer organizations of the different states. Even during the Civil War, the President had no recourse to the militia laws to raise the necessary troops. Yet the accompanying table will show what armed forces could be mustered if the United States militia were called into active service in accordance with the age-limit.

The official census of the population of the United States (1890) gives 13,230,168 as the total of males of militia age; i.e., between 18 and 45. This is reduced to 10,180,043 in the statements furnished by the War Department up to Jan. 1, 1895. The same department gives the following figures relating to the present total strength of the National Guard now under arms as entered upon the state rosters and filed with the department:

Generals and general staff-officers.....	1,524
Cavalry (rank and file).....	5,117
Infantry (rank and file).....	101,224
Naval reserve (rank and file).....	3,461
Total.....	111,326

The total authorized strength of the militia in all the states is 171,984.

Congress appropriates yearly \$400,000 to be divided among the states according to the representation to which each is entitled in Congress, and among the territories and in the District of Columbia in such proportions as the President may direct. The largest Federal appropriation is that granted to New York state, \$41,000, the state itself expending over \$400,000 annually in defraying the expenses of its National Guard.

The armament consists, for the infantry, of Springfield rifles, caliber .45, of all models from that of 1873 to the latest; New York National Guard carry the Remington, caliber .50; three regiments of Connecticut National Guard use the Peabody, .45. Except in New York, Pennsylvania, Georgia and Oregon, the cavalry use the regulation arms of the United States army. The total artillery armament includes 252 muzzle-loading field-pieces, 102 Gatling guns and 11 howitzers. There are 19,614 tents of all styles available.

Nearly all the states and territories have special camping-grounds, whereon the state troops assemble, in detachments, for from five to ten days, yearly, for purposes of drill and campaign training. For the strength of the militia in the various states, see the individual states, in these Supplements.

MILK, ADULTERATION OF. See MILK, Vol. XVI, pp. 301-306.

MILK-FEVER, in lower animals. See VETERINARY SCIENCE, Vol. XXIV, p. 204.

MILK-SNAKE (*Ophiobolus eximius*), a harmless snake of the family *Colubridæ*, inhabiting the eastern United States. It is yellowish gray in color, with a series of dark spots on the back and sides. It is also called chicken-snake, and is one of the so-called king-snakes.

MILK-SUGAR. See SUGAR, Vol. XXII, p. 624.

MILK TREE, any tree exuding a milky juice (latex) which can be used for food, notably certain tropical trees of various families. They are sometimes called cow-trees.

MILKWEED, a name given to the numerous species of the genus *Asclepias*, and referring to the fact that the plants abound in latex, which exudes in milk-like drops from wounds, but becomes viscous and hard upon exposure to the air. The plants are common everywhere, and are characterized by the production of very peculiar flowers adapted to insect-pollination.

MILKY WAY. See ASTRONOMY, Vol. II, pp. 818, 819.

MILLAIS, SIR JOHN EVERETT, a British painter and president of the Royal Academy, was born in Southampton, England, June 8, 1829, and died in London, Aug. 13, 1896. His youth was spent in the Channel Islands, for he came of an ancient Jersey family, and there his sense of the beauty of natural objects was early developed. In 1840 he became a student at the Royal Academy, gaining there two silver medals and also the Society of

Arts medal as a promising pupil. At the age of 17 he exhibited his first ambitious picture, on a historical American theme, *Pizarro Seizing the Inca of Peru*. In 1847 he won the Academy's gold medal in acknowledgment of *The Tribe of Benjamin Seizing the Daughters of Shiloh*, and in 1850 produced his *Christ in the House of His Parents*, a striking picture, popularly known as *The Carpenter's Shop*. This, with the painting Keats's *Isabella*, was the first-fruits of his sym-



SIR JOHN E. MILLAIS.

pathy with the pre-Raphaelite movement, under the impulse of which Millais produced a series of works remarkable for force, beautiful realism and originality. Other work produced at this period includes *The Woodman's Daughter* (1851); *Ophelia* (1852); *Autumn Leaves* (1856); and other fine examples of clever technique and power of coloring. In 1856, Millais was elected an associate and in 1864 a full academician, and for a time turned his attention to historical subjects. These embrace the following notable works: *The Huguenot* (1852); *The Order of Release* and *The Proscribed Royalist* (1853); *The Black Brunswicker* (1860); and a number of similar subjects, which brought him fame with the print-publishers of the era. Though the artist in this class of work popularized his profession, he never forgot its refinements or stooped to cater to a vicious taste. His versatility was no less notable than his industry, for in addition to the attractive subjects already enumerated, Millais was no less successful as a portrait and a landscape painter. His portrait-work, which includes such men as Tennyson, Gladstone, Carlyle, Newman, Bright, Disraeli, Salisbury, was characterized by great power as well as by fidelity and truth. His portraits of child-life were also fine studies in composition and happy inspirations. Among his other notable work are *The Boyhood of Raleigh* (1870); *Yes or No?* (1872); *Hearts are Trumps* (1873); *The Northwest Passage* (1874); *Over the Hills and Far Away* (1876); *A Yeoman of the Guard* (1877); *Effie Deans* (1877); and, perhaps finest of all, his magnificent landscape, *Chill October* (1872), a picture that won for him his greatest meed of fame for its unsurpassable truth and sympathetic realism, and elicited from Meissonier the remark that "the English could paint." On the death of Lord Leighton, in February, 1896, Millais succeeded to the presidency of the Royal Academy. He died of throat disease shortly after his elevation to the presidency of the academy. Sir John Millais was created a baronet in 1885, and in 1878 received from France the decoration of the Legion of Honor.

MILLBURY, a town of Worcester County, east-central Massachusetts, on the Blackstone River, six miles S. of Worcester, on the Boston and Al-

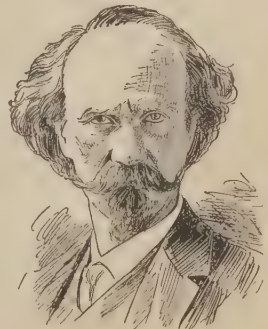
bany and the New York, New Haven and Hartford railroads. It manufactures straw goods, cotton and woolen goods, electric cars, stockings, cutlery, castings, shoes, whips, lumber and carriages. It has electric railways to Worcester, a public library containing 8,300 volumes, a fire department, and a savings bank with over \$800,000 in deposits. Here Thomas Blanchard constructed the first lathe for turning irregular forms. Population 1890, 4,428; 1895, 5,222.

MILLEDGE, JOHN, an American statesman; born in Savannah, Georgia, in 1757; a descendant of one of the earliest settlers in Georgia. He took part in the Revolutionary War, on the side of the colonies, participating in the capture of the royal governor, Sir James Wright, June 17, 1775. Georgia having fallen into British hands, he took refuge in South Carolina. He did good service at the siege of Savannah by the French fleet. In 1780 he was appointed attorney-general of Georgia. From 1792 to 1802 he was a member of Congress, except in the years 1799 and 1800, and from 1802 to 1806 was governor of his state. From 1806 to 1809 he was a member of the United States Senate, and its president *pro tem.* in 1809. He was one of the founders of the city of Athens, and of the State University organized there. By special act of the Georgia legislature, the town of Milledgeville was named after him. He died near Augusta, Georgia, Feb. 9, 1818.

MILLEDGEVILLE, the former capital of Georgia, a city and the capital of Baldwin County, on the Oconee River, at the head of navigation, 28 miles N. E. of Macon, and on the Central Railroad of Georgia, the Georgia and the Middle Georgia and Atlantic railroads. It is in a cotton-growing region, has cotton, oil, pottery and brick manufactories, the state lunatic asylum, state penitentiary, the Middle Georgia Military and Agricultural College, and the Georgia Normal and Industrial College for Girls. It is supplied with water-works and electric lights. Population 1890, 3,322.

MILLEPORA. See CORALS, Vol. VI, p. 383.

MILLER, CINCINNATUS HEINE (pseudonym "Joaquin Miller,"), an American poet; born in the Wabash District, Indiana, Nov. 10, 1847. He removed with his parents to Oregon in 1854, and had an adventurous career during his young days. A member of the famous Walker band of filibusters in Nicaragua, his escape from the bullets of the Nicaraguan soldiery at the collapse of that ill-starred venture was a very narrow one. He had many other adventures, mainly in mining-camps, and lived with the Modoc Indians for some time. Then he returned



JOAQUIN MILLER.

to Oregon, and began the practice of law in 1863, at which he made such a success that he was elected county judge of Grant County, Oregon in 1866, which office he held until 1870. He was the editor of the Eugene *Democratic Register* for a time, in which he defended the noted Mexican brigand, Joaquin Murieta, with such fervor that he became infatuated with his name as well as general characteristics, and on publishing his first volumes of poems in London, he took the name of Joaquin Miller. This volume was published in 1871. It pleased the English critics generally, and he accordingly decided to follow a literary career thereafter. Among his volumes are *Songs of the Sierras* (1871); *Songs of the Sun Lands* (1873); *The Ship in the Desert* (1875); *Songs of Italy* (1878); *Shadows of Shasta* (1881); *The Gold-Seekers of the Sierras* (1884); and *Songs of the Mexican Seas* (1887). In prose, he wrote *The First Families of the Sierras* (1875) and *The Danites* (1881). The latter he dramatized, and the play had a successful run for several years on the American stage.

MILLER, SAMUEL FREEMAN, an American jurist; born in Richmond, Kentucky, April 5, 1816. He graduated from Transylvania University in 1838; practiced law in his native state until 1850, when he removed to Keokuk, Iowa. He was prominent as an abolitionist, and became a leader in the Republican party, but refused all state or local offices offered him, until in 1862 President Lincoln made him an associate justice of the United States supreme court. Among the most important opinions presented by him in court was the one relating to the motion before the Electoral Commission of 1877, which led to the judgment that Congress has no authority to go behind the returns of the legal officers of a state. He died in Washington, District of Columbia, Oct. 13, 1890.

MILLER, WARNER, an American statesman; born in Oswego County, New York, Aug. 12, 1838. He graduated from Union College in 1860, and for a few months taught in the Fort Edward Collegiate Institute. He served in the Civil War, enlisting as a private in a New York cavalry regiment; was elected to the New York assembly in 1874; to Congress in 1878 and 1880; became United States Senator in 1881 to fill the unexpired term of Thomas C. Platt, resigned. He was president of the Nicaragua Canal Company. He was also engaged in the business of manufacturing wood pulp for paper-making.

MILLER, WILLIAM HALLOWES, an English mineralogist and physicist; born in Wales in 1801. He graduated from St. John's College, Cambridge, in 1826; was tutor and fellow of his college; appointed professor of mineralogy (*vice* Dr. Whewell) in 1832. In 1843 he superintended, by order of Parliament, the construction of standards of weight and length, the old standards having been destroyed by fire in 1834. This delicate task was not completed until 1854. In 1870 he served on the international commission upon the metric system. He published a number of mono-

graphs on crystallography and mineralogy in the *Proceedings* of the Royal Society and in special magazines, and was awarded a gold medal by that society, whose foreign secretaryship he held from 1856 to 1873. He died May 20, 1890.

MILLER, WILLIAM HENRY HARRISON, an American jurist; born in New York, Sept. 6, 1840. He graduated from Hamilton College in 1861; served in the army; taught school, and practiced law at Peru and Fort Wayne, Indiana. While at Fort Wayne he was invited to enter the law firm of Harrison and Hines at Indianapolis. When Mr. Harrison entered upon his duties as President of the United States in 1889, Mr. Miller was appointed Attorney-General. At the end of President Harrison's term of office Mr. Miller returned to his law practice.

MILLERSBURG, a village and the capital of Holmes County, northeastern central Ohio, 35 miles S. W. of Canton, on the Killbuck Creek, and on the Baltimore and Ohio and the Cleveland, Akron and Columbus railroads. It is in an agricultural and coal and iron mining region, and contains flour and lumber mills, a furniture factory, brick and tile works, a foundry and a machine-shop. The place is lighted with electricity. Population 1890, 1,923.

MILLERSBURG, a borough of Dauphin County, southeastern Pennsylvania, 25 miles above Harrisburg, on the Susquehanna River, and on the Northern Central railroad. It is in an agricultural and coal-mining region, and is an important coal-shipping point. It has manufactories of wheels, axles, brooms, carpets, taps and dies, and lumber. Population 1890, 1,527.

MILLERSVILLE, a post village of Lancaster County, southeastern Pennsylvania, four miles S. W. of Lancaster. It is in a wheat and tobacco raising country, and contains a cigar factory and the Millersville State Normal School, with about 800 students. Population 1890, 1,241.

MILLET, AIMÉ, a French painter and sculptor; born in Paris, Sept. 27, 1819. He studied painting and sculpture, the latter in the studio of David d'Angers, and had three drawings exhibited at the Salon of 1842. But he finally devoted himself exclusively to sculpture. In the Luxembourg Palace museum and garden are found his *Ariadne* (1857) and his *Phidias* (1887). One of his exquisite creations is *Youth Scattering Flowers*, on the tomb of Henri Murger. His colossal statue of *Vercingétorix*, in hammered copper, has been erected upon the site of the old Gallic city of Alesia, in the mountainous region of Auvergne. His statues of *Edgar Quinet* (bronze) for the city of Bourges, and of *Gay-Lussac* for the city of Limoges, are works of great beauty. He executed the groups on the tombs of *Princess Christine of Montpensier* (in Seville, Spain), and of the *Prince of Saxe-Coburg-Gotha*. The colossal group of *Apollo*, at the top of the façade of the Grand Opera in Paris is his work. He was awarded a first medal at the world's fair of 1867 in Paris, and other gold medals at the Paris expositions of 1878 and 1889. He was created

an officer of the Legion of Honor in 1870. He died in Paris, Jan. 13, 1891.

MILLET, FRANCIS DAVIS, an American painter and author; born in Mattapoisett, Massachusetts, Nov. 3, 1846. He graduated from Harvard in 1869; studied with Van Lerius and De Keyser, at the Antwerp (Belgium) School of Art, being awarded two medals of honor. After acting as American juror in the fine arts section of the Vienna International Exposition in 1874, he followed the Russian army in its campaign of 1877-78, sending letters and illustrations to the London papers. He received decorations from Russia and Roumania. Besides those correspondences, he wrote a number of short stories and articles of criticism, and translated Tolstoi's *Sebastopol* into English. He opened studios in New York City, and in Worcestershire, England; became National Academician in 1885; a member of the Society of American Artists, and of the Royal Institute of Painters, London. His subjects are quite modern in choice and treatment; most of them illustrate scenes he actually witnessed. Such are his *Between Two Fires* (bought by the Royal Academy, London); *Bachi-Bozouk*; *An English Inn* (bought by the Union League Club, New York City). He painted excellent portraits, among them one of *Charles Francis Adams, Jr.*, and one of *Samuel L. Clemens* ("Mark Twain"). He received a second medal at the Paris exposition of 1889.

MILLIKEN'S BEND, a village in Madison Parish, Louisiana, 15 miles above Vicksburg, Mississippi. Here the Confederates, 2,500 in number, commanded by Gen. H. McCullough, attacked a body of negro troops under Gen. E. S. Dennis, but the fire from Admiral Porter's gunboats soon repulsed them.

MILLING-MACHINE. The use of the milling-machine in the manufacture of machinery, etc., is increasing steadily, and each year it usurps more of the work that was formerly given to the planer. The milling-cutter is really a circular-file, and the scientific formation of its cutting edges is understood much better than formerly. As a result, we have larger and better milling-machines, many of them resembling planers, and having several cutters mounted horizontally across the bed. For gear-cutting, nothing compares with the milling-machine. Brown and Sharpe have cut a sixty-tooth six-inch face-gear, three-diametral pitch, in thirty minutes, feeding at the rate of 18 inches a minute. Brooks has built a milling-machine which can finish one side and two edges of a piece having a total surface of 220 square feet at one operation. With the Brown and Sharpe feed of 18 inches per minute this Brooks machine could surface a piece of cast-iron 20 x 8 feet surface, 20 inches thick, on one side and two edges, in 30 minutes, at a cost of less than one dollar. The principal forms of milling-machine now manufactured are the "Lincoln," of which Pratt and Whitney alone have built over 5,000; the pillar-and-knee form, as exhibited in the Brown and Sharpe "Index" machine; and the planer form, as built by Brooks and In-

gersoll. The recent patterns turn out work that is as accurate as that of any other machine-tools, and the quality of the work performed on them has improved steadily with the reduction in cost of production.

C. H. COCHRANE.

MILLS, CHARLES KARSNER, an American neurologist; born at Falls of Schuylkill, Pennsylvania, Dec. 4, 1845; graduated M.D. at the University of Pennsylvania in 1871; was professor of physics in the Wagner Institute of Philadelphia from 1870 to 1873, and lecturer on physics in the Franklin Institute in 1872 and 1873; was lecturer on electrotherapeutics and nervous diseases in the Philadelphia School of Anatomy and Surgery in 1876; on the same subjects in the University of Pennsylvania in 1877, and in the latter year was made lecturer on nervous and mental diseases in that university. He published a number of papers on his specialties in various medical journals, and was the editor of a *System of Nervous Diseases*.

MILLS, CLARK, an American sculptor; born in Onondaga County, New York, Dec. 1, 1815. He never received an art education, but his profession as a caster of stucco ornaments developed his inherent talent as a faithful reproducer of nature. He discovered, in 1835, a new method of taking a cast from the living face, which enabled him to make busts so cheaply that he soon had as much work to do as he could attend to. He then cut a bust of John C. Calhoun in marble, for which he was awarded a gold medal by the city council of Charleston, South Carolina. It was placed in the city hall there. Subsequently he executed busts of John Preston, Wade Hampton and other eminent South Carolinians. From 1848 till 1853 he was at work making an equestrian statue of General Jackson, which was unveiled at Washington, District of Columbia, on the anniversary of the battle of New Orleans in 1853. It stands on Lafayette Square, and was cast from cannon taken from the British during the war of 1812. Later he executed a colossal statue of Washington, representing him during the battle of Princeton. It was dedicated in Washington, District of Columbia, on Feb. 22, 1860. In 1860-63 he made his statue of *Freedom*, after Crawford's designs, which now stands above the dome of the capitol. He died in Washington, District of Columbia, Jan. 12, 1883.

MILLS, ROBERT, an American architect; born in Charleston, South Carolina, Aug. 12, 1781. A pupil of Benjamin H. Latrobe, the original designer of the capitol in Washington; designed and supervised the construction of part of Independence Hall, Philadelphia; the state capitol, Harrisburg, Pennsylvania, and the Schuylkill single-arch bridge; also several United States custom-houses and marine hospitals; appointed state engineer and architect of South Carolina in 1820. As United States architect in Washington, District of Columbia, in 1830 he superintended the building of the Post-Office Department, the Patent-Office and Treasury buildings. He made

the original design of the Washington Monument, begun in 1848. He wrote *Statistics of South Carolina, with an Atlas* (1826); *The American Pharos; or, Lighthouse Guide* (1832); and a *Guide to the National Executive Offices* (1842). He died in Washington, District of Columbia, March 3, 1855.

MILLS, ROGER Q., an American statesman; born in Todd County, Kentucky, March 30, 1832; settled in Texas and practiced law at Corsicana. He served a term in the state legislature; in 1872 was elected to the House of Representatives of the Forty-third Congress, as a Democrat, and held that office by successive re-elections until March 23, 1892, when he was elected United States Senator. Mr. Mills was re-elected for the term ending March 3, 1899.

MILLS, SAMUEL JOHN, an American clergyman; born in Torrington, Connecticut, April 21, 1783. He graduated from Williams in 1809 and Andover Theological Seminary in 1812. Having resolved to devote his life to foreign mission work, he began, while yet a student, to deliver addresses on the subject, which brought about the formation of the American Board of Commissioners for Foreign Missions in 1810. He traveled as missionary over the West and Southwest from 1812 to 1815, and soon realized that Bibles were found in very small numbers all over the region he visited. He immediately set at work supplying the want, and his efforts contributed to the foundation of the American Bible Society in 1816. He was ordained in 1815, and gave his attention to the education of negroes. He became the agent for collecting funds to endow a special school for young men of negro blood desirous of becoming preachers and teachers among their own people. The American Colonization Society having been founded in 1817, he was sent to the west coast of Africa to select the best possible location for a negro settlement. When homeward bound, he died at sea, June 18, 1818. He was called "the Father of Foreign Missions."

MILL SPRINGS or FISHING CREEK, a hamlet in Wayne County, Kentucky, on the Cumberland River, about eighty miles S. of Lexington. The immediate vicinity was the scene of an engagement, Jan. 19, 1862, between the Federal forces under General George H. Thomas and the Confederates under General George B. Crittenden. The Federal army consisted of about 8,000 men and the Confederate, of about 5,000. Thomas had placed his troops in a strong position and was assaulted at night by the Confederates, led by General Zollicoffer. The attacking party was repulsed with loss, among the killed being Zollicoffer. The loss to the Federals was 232 killed and wounded, and to the Confederates, 339 killed, wounded and taken prisoner.

MILLVILLE, a city in Cumberland County, southern New Jersey, 41 miles S.E. of Philadelphia, on the Maurice River, at the head of navigation, and on the West Jersey railroad. It is connected with Bridgeton by electric railway, and has street-railways, electric lights, gas, fifteen public schools, a public library and park.

It has extensive glass manufactories and cotton-mills. It is in a fruit and potato growing region. Population 1890, 10,002; 1895, 10,466.

MILMORE, MARTIN, an American sculptor; born in Sligo, Ireland, Sept. 14, 1844. When six years old he removed to America with his parents; graduated from the Boston Latin School in 1860, and entered the studio of Thomas Ball, remaining with him about a year, when he opened a studio of his own in Boston, a year later went to Rome, where he remained several years. Returning to Boston, he opened a studio again, and made several notable busts, those of Theodore Parker, Charles Sumner and Wendell Phillips particularly being accepted as classical. He did three granite figures of *Ceres*, *Flora* and *Pomona*, for Horticultural Hall, in Boston; an imposing *America* at Fitchburg, and the *Weeping Lion* at Waterville, Maine. He designed, in 1867, a bronze statue for the soldiers' monument at Forest Hills Cemetery, in Roxbury, Massachusetts; and in 1882 was commissioned by the city of Boston to execute an army and navy monument, which, when completed, was placed on Boston Common, and excited some good-natured criticism because the face and figure of a sailor was an undeniable likeness of his brother Joseph, while the Goddess of Liberty and another female figure were likenesses of two other members of his family, who had posed to him as models. His last work was a bust of Daniel Webster for the New Hampshire state-house at Concord. He died in Boston, July 21, 1883.

MILNE, SIR ALEXANDER, an English sailor; born in England in 1806; second son of Admiral Sir David Milne; entered the royal navy when only 11 years old. In 1830 he was appointed commander; captain in 1839; flag-captain to his father from 1842 to 1845; appointed junior lord of the Admiralty (1847-58). He introduced many important measures for the benefit of the service. He was again on the board as senior naval lord from 1866 to 1868 and 1872 to 1876. He was the first British admiral who visited the United States after the War of 1812; landed in 1863, and was received very cordially. As commander-in-chief of the Mediterranean squadron he was present at the opening of the Suez canal in 1869. The following year he was for a time in command of the united Mediterranean and Channel squadrons. On his return he retired and was elected an elder brother of the Trinity House. He was created a baronet in 1876.

MILNE-EDWARDS, HENRI, a French naturalist, whose father was an Englishman; born in Bruges, Oct. 23, 1800. He studied medicine at Paris, where he took his degree of M.D. in 1823, but devoted himself to natural history. He was successively professor of natural history at the Henry IV Lyceum, Paris, and at the Museum of Natural History in 1841; professor of zoölogy at the Sorbonne in 1862. He was elected in 1838 member of the Académie des Sciences to succeed Cuvier. He was an indefatigable worker and a classifier of great intelligence and precision.

Among his more important works are *Elements of Zoology*, a high-class text-book (1834-35); *Natural History of Crustaceans* (1837-41); *Leçons sur la Physiologie* (10 vols.); and a very large number of monographs inserted in scientific periodicals. He died in Paris, July 29, 1885.

MILNES, MONCKTON. See HOUGHTON, LORD, in these Supplements.

MILO, an island. See MELOS, Vol. XV, p. 841.

MILTON, a city and the capital of Santa Rosa County, western Florida, 18 miles N.E. of Pensacola, on the Louisville and Nashville railroad, and on the Blackwater River. It is in a cotton, lumber, wool and fruit producing region, and contains foundries, mills and a dry-dock, and has a large lumber trade. Population 1890, 1,455.

MILTON, a town of Norfolk County, central eastern Massachusetts, seven miles S. of Boston, on the New York, New Haven and Hartford railroad, and on the Neponset River. Paper, leather, chocolate and rubber goods are manufactured. Market-gardening is carried on largely in the vicinity. It has electric-railway connection with Boston, Dedham and Quincy; is the seat of Milton Academy, chartered in 1798; has 30 public schools, a public library with 11,260 volumes, and a national bank with \$200,000 capital. It is also a residence town for Boston business men. Population 1890, 4,278; 1895, 5,518.

MILTON, a post borough of Northumberland County, eastern central Pennsylvania, 33 miles below Williamsport, on the Susquehanna River, and on the Pennsylvania railroad and the Philadelphia and the Pennsylvania canal. It has a library, 22 graded public schools, banks, etc. Its industries include axle-forges, bolt, nut and washer works, fly-net factories, steam tannery, manufactories of lumber, car-works, machine-shops, agricultural works and foundries; also a rolling-mill and a nail factory. It was destroyed by fire in 1882, but recovered rapidly from the catastrophe. Population 1890, 5,317.

MILWAUKEE, a city of Wisconsin. Milwaukee has become famous for its lager beer, of which there were sold, in 1892, 2,023,100 barrels, an increase over 1891 of 145,943 barrels. According to the census of 1890, Milwaukee reported 201 industries, with 2,879 establishments, having a capital of \$69,146,000, employing 43,423 hands; \$21,000,000 were paid for services, while the output was \$97,500,000. Milwaukee ranks seventh in the lake traffic. The total tonnage of the freight movement by water in Milwaukee was, in 1890, 1,935,808. The indebtedness of the city is about \$5,300,000, nearly half of which is water debt. The water brought from the lake is distributed from a large reservoir 150 feet high. There is an efficient system of public schools, 43 in number, including the high schools, with an enrollment of 29,000 pupils. The principal buildings lately constructed are the new custom-house and post-office (cost, \$1,500,000); the Industrial Exposition building, the Layton Art Gallery, besides some handsome churches and depots. The city has a public library. There is an efficient fire

department of 252 men, with 18 steam fire engines, 17 hose-carriages, 8 hook-and-ladder trucks, 1 fire-boat, and 7 chemical engines. There are over 44 miles of paved streets, and over 197 of streets otherwise improved, 210 miles of sewers, and 202 of water-mains. Several bridges are turned by electricity. By the laws of 1891 a park board was created; 600 acres of land in various localities have been purchased and a system of parks planned. Milwaukee has a good system of electric railways, and is lighted with arc-lights. It is very healthful, as is shown by its death rate, 1.7 per cent. The population of Milwaukee in 1890 was 204,468, about one half German; 1895, 249,290, a little less than a third German. See also MILWAUKEE, Vol. XVI, pp. 340, 341.

MIMAMSA. See SANSKRIT, Vol. XXI, pp. 289, 290.

MIMES OR MIMI. See DRAMA, Vol. VII, pp. 409-412.

MIMICRY. See HEREDITY, in these Supplements.

MIN OR AMMON. See EGYPT, Vol. VII, pp. 717, 718.

MINA. See NUMISMATICS, Vol. XVII, p. 631.

MINA-BIRD OR MYNA. See GRACKLE, Vol. XI, p. 26.

MINARET. See MOSQUE, Vol. XVI, p. 863.

MINAS, the capital of a wild, mountainous province (area, 4,844 square miles; population, 23,000) of the same name in southern Uruguay, 75 miles by rail N.E. of Montevideo. Population, 7,000.

MINAS GERAES, the most populous state of Brazil, has an area of 222,160 square miles. Population 1890, 3,018,807. Lying wholly in the table-land, its surface is occupied with grass and bush-covered campos, rising, however, in the Serra do Espinhaco to 5,900 feet. The principal rivers include the navigable São Francisco and the Rio Grande, which unites with the Paranaíba to form the Paraná. Agriculture and stock-raising are the chief industries. Some gold is still obtained, and diamonds, iron and lead are mined. Capital, Ouro Preto, with a population of about 20,000.

MINCIO. See ITALY, Vol. XIII, p. 436.

MIND. See PSYCHOLOGY, Vol. XX, pp. 39-44.

MINDANAO. See PHILIPPINE ISLANDS, Vol. XVIII, p. 752.

MINDELEFF, COSMOS, an American archaeologist; born in 1863, of Russian parents, who removed to the United States before his birth. In 1876 he graduated from a private school and entered business. His personal studies soon were concentrated upon researches in the domain of American ethnology, and he finally, in 1882, became connected with the United States Bureau of Ethnology. He chose as his special field of investigation, the aboriginal architecture of the Pueblo region. Assisted by his brother Victor, he published *A Study of Pueblo Architecture: Tusayan and Cibola* (1886), and in this work described for the first time the snake-dance of the Moki Indians. His complete plans for the restoration of the Casa Grande ruin in Arizona attracted much

attention. He made a specialty of reproducing in exact models the leading archæological and topographical finds of the last decades.

MINDEN, a town and the capital of Webster Parish, northwestern Louisiana, 28 miles E. N. E. of Shreveport, on Bayou Dorcheat, and on the Minden railroad, which connects with the Vicksburg, Shreveport and Pacific. Cotton and lumber are the chief articles of export. It has a college for women and the Minden Academy or high school. Population 1890, 1,298.

MINDEN, a city and the capital of Kearney County, central southern Nebraska, 30 miles W. of Hastings, on the Burlington and Missouri River and the St. Joseph and Grand Island railroads. It is surrounded by good farming country, and has a creamery, mills, brickyards, wagon and milling works. Population 1890, 1,380.

MINDORO. See PHILIPPINE ISLANDS, Vol. XVIII, p. 752.

MINEOLA, a flourishing town of Wood County, northeastern Texas, 80 miles E. of Dallas, on the Texas and Pacific, the International and Great Northern and the Missouri, Kansas and Texas railroads. It is in a cotton, live-stock and lumbering region, and is the trade and shipping center for a considerable area. Population 1890, 1,333.

MINER, ALONZO AMES, an American clergyman and educator; born in Lempster, New Hampshire, Aug. 17, 1814. He was ordained a minister of the Universalist Church in 1839 and held pastorates in Methuen and Lowell, Massachusetts. He founded Tufts College, Massachusetts, and from 1862 to 1874 was its president. He was active in temperance work, and in 1878 was the candidate, for governor, of the Prohibitionists. He was a member of the State Board of Education for over twenty years; edited the *Story of Bethlehem*, and published *Old Forts Taken* (1878). He died in Boston, Massachusetts, June 14, 1895.

MINERAL POINT, a city of Iowa County, southwestern Wisconsin, 34 miles W. S. W. of Madison, on the Chicago, Milwaukee and St. Paul railroad. It is in a farming, stock-raising and lead-mining region, and contains grist-mills, foundries, a car-shop and zinc and lead furnaces. Population 1890, 2,694; 1895, 3,136.

MINERAL SPRINGS. See GEOLOGY, Vol. X, p. 270; and MINERAL WATERS, Vol. XVI, pp. 431-437.

MINERAL WAX. See *Ozocerite*, under MINERALOGY, Vol. XVI, p. 429.

MINERAL WOOL. See IRON, Vol. XIII, p. 307.

MINER'S INCH, a unit for measuring water, which is defined as "the amount of water that will pass in 24 hours through an opening 1 inch square under a pressure of 6 inches." This unit of measurement is peculiar to the Western states of America, and used not only for mining purposes, but whenever it is desired to measure the amount of water distributed for irrigation. The average discharge from such an opening (called "a module") is one and one half cubic feet per

minute. In the various states, from Colorado to California, there are some slight variations in this unit.

MINERSVILLE, a post borough of Schuylkill County, central eastern Pennsylvania, four miles W. of Pottsville, on the Philadelphia and Reading and two local railroads, and on the west branch of the Schuylkill River. Coal-mining is the chief industry, and the town contains water-works, a fire department, foundries and an anthracite furnace. It has a public library, and is lighted with electricity and supplied with city water. Population 1890, 3,504.

MINGHETTI, MARCO, an Italian statesman; born in Bologna, Sept. 8, 1818. He supplemented a course at his university by a prolonged tour in France, Germany and Great Britain. With the election in 1846 of Pope Pius IX, Minghetti started a journal in aid of his country's regeneration. He fought with the Lombards under King Charles Albert until the defeat at Novara, and was promoted repeatedly. In 1859-60 he was Cavour's Secretary for Foreign Affairs. His next post was that of Minister of the Interior, and previous to Cavour's death in 1861, he was regarded as his ablest representative in the Italian Chamber. In 1863 he became Prime Minister; in 1864 he concluded with the Emperor Napoleon the "September Convention." In 1868 he was Italian minister in London and thereafter Minister of Agriculture. In 1870 the collapse of the second empire brought with it the dissolution of the September Convention, and Rome became the capital of Italy and seat of government. From 1873 to 1876 Minghetti was Prime Minister for the second time, and, among many useful measures, earned his country's gratitude by effecting the "parraggio," or financial equilibrium between her outlay and income. For the next ten years Minghetti was still the most prominent member of the Italian Parliament. His lectures and essays on Raphael and Dante illustrate, on the æsthetic side, a catholicity of culture which, in the sphere of practical politics, is visible in his treatises on *Economica Pubblica* (1859); and *La Chiesa e lo Stato* (1878). He died in Rome, Dec. 10, 1886.

MINICOY ISLAND. See LACCADIVES, Vol. XIV, p. 183.

MINIÉ BALL. See GUNMAKING, Vol. XI, p. 282.

MINIMS or MINIMI, ORDER OF THE. See FRANCIS OF PAOLA, Vol. IX, p. 695.

MINING SCHOOLS. See TECHNICAL SCHOOLS, in these Supplements.

MINISTERS. See INTERNATIONAL LAW, Vol. XIII, p. 193.

MINIUM, a mineral pigment. See MINERALOGY, Vol. XVI, p. 387.

MINNEAPOLIS, a city and the capital of Ottawa County, northeastern central Kansas, 20 miles N. of Salina, on Solomon River, and on the Atchison, Topeka and Santa Fé and the Union Pacific railroads. It is in an agricultural and stock-raising region, and contains saw and grist mills, a carriage factory, a machine-shop and foundry. Population 1890, 1,840; 1895, 1,559.

MINNEAPOLIS, a city of southeastern Minnesota. Although the city is at the nominal head of navigation of the Mississippi River, only two lower-river steamboats have landed at the Minneapolis docks for eighteen years. It has good railroad facilities, being on the Chicago, Milwaukee and St. Paul, the Northern Pacific, the Great Northern, the Minneapolis and St. Louis and five other large railroads. The city railroad system, now

lakes, which afford fine boating, fishing and bathing, and the surrounding country affords good hunting. These advantages have made Minneapolis quite popular as a summer and autumn resort.

The city now covers an area of 53 square miles; and on the east its city limits coincide with those of St. Paul. Population 1880, 46,887; 1890, 164,738; 1895, 192,883. See also MINNEAPOLIS, Vol. XVI, pp. 474, 475.

INDUSTRIAL ESTABLISHMENTS.	NUMBER OF ESTABLISHMENTS REPORTING.	CAPITAL.	EMPLOYEES.	WAGES.	VALUE OF PRODUCTS.
Lumber products from logs or bolts-----	17	\$8,382,304	2,475	\$1,002,949	\$7,215,293
Planing-mill products, sashes, blinds, etc-----	22	2,077,593	1,419	803,243	2,411,682
Flour and grist mill products-----	25	10,701,068	1,621	1,043,858	30,707,998
Other industries-----	2,659	21,482,999	22,177	12,404,125	46,588,001
Total-----	2,723	\$42,643,964	27,692	\$15,254,175	\$86,922,974

operated by electricity, is continuous with the St. Paul system and controlled by the same company. The city is lighted with electricity, and controls its own water-works. The most striking buildings are the Chamber of Commerce, the Exposition Building, the West Hotel, the Lumberman's Exchange, and the residence of W. D. Washburn, costing \$1,000,000. It also contains opera-houses, city and county buildings, engine-houses, banks, schools and several seminaries and professional schools. Situated here are the State University, Hamline University, Augsburg Theological Seminary, and Macalester College. The parks of Minneapolis comprise 1,155 acres and are valued at \$3,918,400. In connection with these are 19½ miles of boulevards and parkways. This property was acquired mainly by direct purchase at about one fifth of its present value. It costs to maintain this system about \$25,000 a year. Lake Harriet Park covers 415 acres, and the park surrounding the Falls of Minnehaha, made famous by the poet Longfellow, 173 acres. Minneapolis is essentially a wheat and lumber center. It is the chief shipping and manufacturing center of all the timber regions of the upper Mississippi Valley. More than half the wheat raised in Minnesota is made into flour by the mills of this city, something over 20,000,000 bushels per annum being ground here. The Pillsbury "A" mill is the second largest in the world, having a maximum capacity of 25,000 bushels per day. Nearly all the money paid for grain in the interior is sent from Minneapolis by elevator companies and millers. The elevator capacity of Minneapolis, not including the storage capacity of the mills and mill-elevators, is 15,415,000 bushels. The city is the greatest primary wheat market in the world; 41,734,095 bushels of wheat were received and 12,877,370 bushels shipped from Minneapolis, as compared with 15,973,285 bushels received and 10,916,604 bushels shipped from New York, which ranked next. The table of industrial establishments above is taken from the United States census of 1890.

The climate of Minneapolis is healthful and bracing. In the vicinity are numerous beautiful

MINNEHAHA CREEK, the outlet of Minnetonka and other lakes, flows into the Mississippi River midway between St. Paul and Minneapolis. It has a beautiful perpendicular fall of fifty feet, which forms a popular resort for tourists. Longfellow named the principal female character of his *Song of Hiawatha* for these falls.

MINNESÄNGER. See GERMANY, Vol. X, p. 525.

MINNESOTA, in 1890, had a population of 1,301,826, its relative rank among the states



SEAL OF THE STATE OF MINNESOTA.

being twentieth. In 1880 the population was 780,773, the rank twenty-sixth, the gain in the ten years amounting to 66.74 per cent. The area of the state is 83,365 square miles, of which 4,160 is water surface and 79,205 land surface. The density of population is 16.44 to the square mile, having increased from 9.86 in 1880, 5.55 in 1870 and 2.17 in 1860. The six cities of the state had a population of 369,315, constituting 28.37 per cent of the whole, more than double the percentage of 1880. The number of males was 695,321; of females, 606,505. The percentage of native-born citizens was 64.10; that of foreign-born, 35.90. The number of negroes in Minnesota was 3,683 in 1890,—an increase of 2,119 since 1880. In 1895 a state census was taken, which showed the total population to be 1,574,610,—an increase of 272,793 from 1890.

The total number of farms in Minnesota in 1890 was 116,851—an increase of almost 25,000 since 1880; the average size was 160 acres,—an increase of 15 acres in the same period; the total acreage of the farms of the state was 18,663,645,—an increase of more than 5,000,000 acres. Of these lands, 60 per cent was improved,—a material gain for the ten years. In 1880 the total value of the

INDUSTRIES.	NUMBER.	CAPITAL.	WORKERS.	WAGES.	PRODUCT.
All industries -----	7,505	\$127,686,618	79,629	\$38,189,239	\$192,033,478
Lumber and timber -----	446	43,821,986	7,906	6,174,395	30,018,583
Flouring and grist mill products -----	307	19,518,743	4,038	2,243,855	60,158,088
Boots and shoes -----	8	1,794,711	1,182	614,022	2,032,814
Car-construction -----	18	2,926,860	2,017	1,276,031	2,628,174
Cheese, butter and condensed milk -----	106	606,184	855	397,618	2,958,476
Cooperage -----	59	447,129	1,016	485,546	1,687,060
Agricultural implements -----	23	5,136,542	602	363,080	1,622,951
Foundry and machine-shop products -----	92	2,403,725	1,469	979,142	2,835,024
Masonry, brick and stone -----	285	2,963,622	7,348	3,787,226	11,330,950

lands, fences, buildings, farm implements and machinery and the live-stock was \$238,718,864, which had increased in 1890 to \$414,701,626. The estimated value of the farm products for the first-mentioned year was \$49,468,951; for the latter, \$71,238,230. In 1890 there were 461,509 horses; 9,511 mules; 1,373,579 neat cattle, which included 593,908 milch cows, 853,715 swine, and 399,049 sheep, from which had been sheared 1,945,249 pounds of wool. The following table shows the relative standing of Minnesota in the area and production of the cereals, the percentages given being that of the entire crop or area of the United States:

	AREA.			PRODUCTION.		
	R'nk	Acres.	Per Cent.	R'nk.	Bushels.	Per Cent.
All cereals	8	6,297,044	4.49	8	137,590,535	3.91
Ind. Corn	21	901,690	1.25	20	24,666,446	1.16
Wheat ---	1	3,372,627	10.04	1	52,300,247	11.17
Oats -----	5	1,579,258	5.58	4	49,958,791	6.17
Barley ----	4	358,510	11.13	4	9,100,683	11.62
Rye -----	11	62,869	2.89	8	1,252,663	4.41
Buckwh't	7	22,090	2.64	7	281,705	2.33

Much attention is given to dairy-farming, the census reports showing that the increase in the number of milch cows from 1880 to 1890 was 318,363, or more than 115 per cent. Minnesota was one of the few states producing 100 gallons or upward of milk per capita of population. The report of the dairy commissioner for 1895 showed 253 creameries in the state and near 100 cheese factories. More than 50,000 dairy farmers furnish milk or cream to the creameries, and the industry is growing constantly and proving to be one of the most profitable in agriculture. All branches of farming are being extended, modern methods coming into general use, and the results are increased areas and production in all parts of the state. The crop of wheat for the year 1895 was estimated at 65,000,000 bushels,—an increase of almost 13,000,000 over that of 1890. Almost 3,000,000 acres of meadow land are annually mown for hay, the various kinds producing 3,500,000 tons in 1895. Nearly 100,000 bushels of clover-seed were produced and more than 500,000 bushels of other grass-seed. In the production of flax Minnesota stood second in acreage, first in production of seed, eighth in the production of fiber, and first in the total value of the product. The increase in the production of flaxseed from 1880 to 1890 was twenty-seven-

fold. In 1895 more than two thirds of the flax crop of the United States was produced in the region tributary to St. Paul, Minneapolis and Duluth, and the utilization of the flax fiber for the manufacture of tow, twine cordage, bagging, paper and linen had become an industry of prominence and importance.

The statistics of manufactures, as reported in the eleventh decennial census, showed that Minnesota had made the greatest advance in the relative rank, both according to gross value and according to net value of products, having advanced from thirty-sixth place in gross value and thirty-fifth place in net value of products in 1850 to the thirteenth and fourteenth places, respectively, in 1890. The state also showed the greatest advance in the number of employees and the amount paid for wages. The following table shows some of the leading lines of manufacture, together with information in regard thereto:

In addition to the above, the various clothing manufactories had invested about \$2,500,000, employed nearly 5,000 persons, to whom were paid about \$2,225,000, and finished products turned out to the approximate value of \$6,500,000. Slaughtering and meat-packing products were turned out to the value of almost \$3,000,000 and liquors to almost an equal amount. The manufacturing interests of Minnesota are enhanced greatly by the fine water-power in almost all parts of the state. The power at Minneapolis (q. v., in Vol. XVI, pp. 474, 475) is very considerable, and is utilized to a great extent.

The area of Minnesota is, as already stated, 83,365 square miles, of which 4,160 is water and 79,205 square miles land. Within the state are numerous lakes, estimated at as many as 10,000 in number, ranging in size from 340 square miles (Red Lake) down to ponds of a few acres.

One of the most considerable sources of wealth to the people of Minnesota has been the lumber industry. Originally about five-eighths, or more than 50,000 square miles, of the state were covered with a heavy growth of timber. In the northern part of the state the principal varieties of timber were the white and yellow pine, white cedar, spruce, tamarack and birch. In the south were large growths of oak, elm, bass and maple. The facilities for transportation by water were so abundant that early in the history of the state the lumber industry took a high rank, and from 1870 to 1880 the annual returns from the business were not far from \$10,000,000.

From 1880 to 1890 the industry yielded an annual return of from ten to fifteen millions, and in 1893 the business had reached the amount of \$17,898,780. Forest fires have destroyed thousands of acres of the most valuable timber-lands of the state, and the prodigality with which the timber has been sacrificed has combined with the destruction by fire to reduce the product to at least one half of what it might otherwise have been.

The minerals of Minnesota are many and of inexhaustible quantity. The geological reports made in 1893 on the production of iron ores showed that Minnesota had passed New York and Pennsylvania in production, and occupied the rank of third among the iron-producing states, the output the year previous to the report having been 1,225,465 long tons, or almost 8 per cent of the total for the United States (see IRON AND STEEL, in these Supplements). Gold has been found in the north part of the state, in the region of Rainy Lake and the Lake of the Woods. There were in operation, in Minnesota, in 1893, 102 stone-quarries, which yielded a return of considerably over a million dollars. The granite-quarries yielded about one third of this amount, limestone following with a little over one half and sandstone making up the remainder.

The fisheries of the state are not fully reported, but the estimates place the number of persons engaged in lake and inland fishery at about one thousand and the value of the annual catch at two hundred thousand dollars.

The state banks of Minnesota numbered 144 in July, 1894—an increase of 27 within the two years preceding. At the same date there were 79 national banks, and 196 private banks, making in all 419 banking institutions within the state. There were also 14 savings associations and 9 loan and trust companies, and 15 national and 57 local building and loan associations were in operation at the date of the report of the banks, the financial recapitulation of all of the above institutions making the following showing:

	CAPITAL STOCK PAID IN.	SURPLUS.	UNDIVIDED PROFITS.	AGGREGATES.
State banks-----	\$9,098,300.00	\$945,849.30	\$1,729,197.14	\$11,773,346.44
National banks-----	15,545,000.00	2,612,434.27	2,017,598.48	20,175,032.75
*State savings banks-----	9,943,407.41	61,600.00	78,553.48	10,083,560.89
Private banks-----	4,043,713.00	554,462.00	149,590.00	4,747,765.00
Loan and trust companies-----	3,778,867.83	681,610.99	624,932.81	5,085,411.63
National building and loan associations-----	7,639,500.97	-----	806,312.26	8,445,813.23
Local building and loan associations-----	3,715,089.83	-----	404,996.88	4,120,086.71
Local building and loan associations in outside cities	1,063,722.71	-----	39,651.41	1,103,374.12
Totals-----	\$54,827,601.75	\$4,855,956.56	\$5,850,832.46	\$65,534,390.77

The railroads of the state had a combined mileage, in 1895, of almost 5,900 miles, which had cost for construction and equipment over \$233,000,000. The state tax of three per cent on the gross earnings amounted, for several years prior to 1896, to a little more than a million

dollars annually, and is the only tax levied against the railroads of Minnesota, regardless of valuations. Almost all of the roads radiate from Minneapolis and St. Paul, making these cities important centers. The rivers of the state afford navigation for almost three thousand miles, and Lake Superior gives an outlet to the products of the state to all parts of the world.

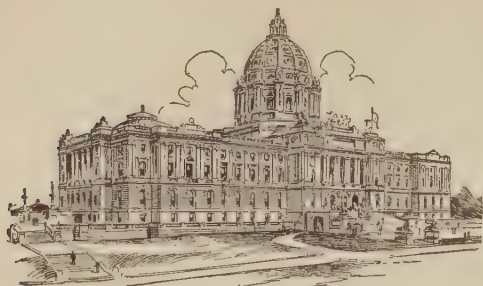
The superintendent of public instruction made the following report for the year 1894: Persons in the state between the school ages of 5 and 21 years, 540,417; number of pupils enrolled, 275,368; number of pupils attending the public schools not entitled to the apportionment, 67,393, making the total enrollment 342,761. The number of teachers employed was, male, 1,931; female, 5,634; the wages of the former averaging \$39.38 per month and of the latter \$32.66. During the year there were held 17 state institutes, at which 1,035 teachers were enrolled, and 46 teachers' training schools, attended by 5,947 teachers. There were 88 high schools under the supervision of the state high school board, attended by 17,539 pupils. The school districts of the state numbered 6,111, and 273 new schoolhouses were erected during the year. The value of all schoolhouses and sites within the state was \$12,227,134, and the value of school apparatus and libraries exceeded \$600,000. State normal schools are maintained at Winona, Mankato, St. Cloud and Moorehead, at which some 1,850 pupils were enrolled in 1895. In the text-book libraries of these four schools are more than 20,000 volumes. The state university (q.v., in these Supplements) had, in 1894, 1,828 students, the total number of graduates up to that time being 1,097. The current school fund for the year mentioned was \$1,016,413, and the amount paid for teachers' salaries amounted to \$2,982,700. For teachers' institutes and training schools there was expended the sum of \$27,000; for the support of state high schools, \$38,000; the normal schools at Winona, Mankato and St. Cloud each received the sum of \$24,000, the one at Moorehead \$16,000, and for the state university the different appropriations aggregated

almost \$100,000. The permanent school fund of Minnesota amounts to \$10,712,120. Many of the schools of the state exhibited their work at the World's Columbian Exposition, and numerous awards were received.

Of the denominational institutions of learning in Minnesota, Augsburg Seminary at Minneapolis,

*Including deposits.

St. Olaf College at Northfield, and Gustavus Adolphus College at St. Peter are all under Lutheran control. Hamline University at Hamline and St. Paul's College at St. Paul Park are both controlled by the Methodist Episcopal Church. The Roman Catholic Church has St.



STATE CAPITOL BUILDING, ST. PAUL.

John's University at Collegeville, the Christian Church has the Northwestern Christian College at Excelsior, the Congregational Church has Carleton College at Northfield and the Free Baptist Church has Parker College at Winnebago City.

Minnesota had, in 1890, 3,429 church organizations, 2,619 edifices, and a total membership of 532,590, which constituted 40.91 per cent of the population, and church property of the value of \$12,940,152. There were represented 39 denominations, the principal ones being the Baptists, all bodies, 229; the Adventists, 85; Roman Catholics, 465; Congregationalists, 175; Evangelical Association, 134; German Evangelical Synod, 53; all Lutherans, 1,141; all Methodists, 591, all Presbyterians, 185; Protestant Episcopal, 171; and United Brethren, 35.

Jan 1, 1896, there were 570 newspapers of all kinds published in Minnesota. Papers were published in 79 of the 81 counties of the state, in 261 cities, towns and villages, and in 73 of the county seats. Of the whole number of papers, 36 were daily, 1 semiweekly, 481 weekly, 1 fortnightly, 14 semimonthly and 37 monthly.

The assessed valuation of all personal property in the state in 1893 was \$98,947,498, and of the real estate \$543,956,153, making a total of \$642,903,651. The total taxes levied amounted to \$14,645,741. The report of the state treasurer for the fiscal year ending July 31, 1895, showed the receipts for the year to have been \$5,426,935, the balance carried over from the preceding year, \$2,095,924, making the total receipts from all sources, including balances and transfers, \$7,730,977. The total expenditures were \$5,478,751, leaving a balance in the treasury of \$2,044,109. On Aug. 4, 1894, the total debt of the state was \$1,959,000, to the extinguishment of which there were funds to the amount of \$66,816, leaving the net debt \$1,892,184.

The state institutions of Minnesota have cost for buildings, up to and including 1894, the sum of \$6,072,577, the total amount expended for their

support from organization up to the same time having been \$12,570,586. The following is a statement of the total cost of the buildings of each institution, the amount expended for maintenance in 1894, and the total amount expended for support:

	BUILDINGS.	MAINTENANCE, 1894.	TOTAL EXPENDED FOR MAINTENANCE.
State prison-----	\$717,210	\$105,446	\$1,535,230
Reform school-----	300,243	45,214	806,337
State reformatory----	186,952	49,976	238,532
Insane hospitals-----	1,824,932	477,587	4,945,669
University-----	766,055	223,687	1,873,416
Normal schools-----	498,037	95,386	1,153,449
Deaf, dumb, blind and imbecile-----	582,174	133,816	1,474,904
State public school----	161,242	27,558	182,289
Soldiers' orphans-----	-----	-----	110,102
Minnesota Soldiers' Home-----	224,195	63,620	250,717
Rebuilding capitol----	420,230	-----	-----
New capitol-----	242,305	-----	-----
State Agricultural Soc.-----	150,000	-----	-----

In 1895 the National Guard of Minnesota consisted of one brigade, which was made up of three regiments of infantry and one battalion of artillery. The infantry is divided into 26 companies, and the artillery into 2 batteries of 2 guns each. The comparative strength of the guard was 1,977 officers and men. The annual expenses incurred by the state for the maintenance of the militia amount to an average of \$20,000.

The following table gives the principal cities of Minnesota, and shows their comparative growth during the five years from 1890 to 1895. The population in 1880 is also given for comparison.

	1895.	1890.	1880.	PER CENT INCREASE, 1890-95.
Minneapolis-----	192,833	164,738	46,887	17.06
St. Paul-----	140,292	133,156	41,473	5.36
Duluth-----	59,396	33,115	838	79.36
Winona-----	20,649	18,208	10,208	1.34
Stillwater-----	12,004	11,260	9,005	.66
Mankato-----	10,173	8,838	5,550	15.11
St. Cloud-----	9,178	7,686	2,462	19.41
Red Wing-----	7,685	6,294	5,876	22.10
Faribault-----	7,616	6,520	5,415	16.81
Brainerd-----	7,031	5,703	1,865	23.29
Rochester-----	6,429	5,321	5,103	20.82
Little Falls-----	5,116	2,354	508	117.33
Austin-----	5,087	3,901	2,305	30.40

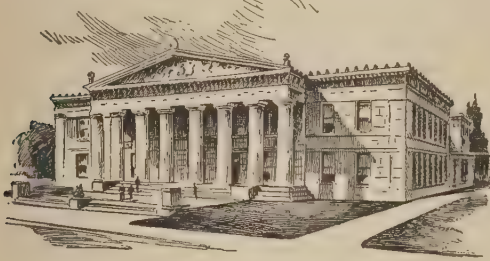
In addition to the above, there are 5 cities with a population in excess of 4,000, 6 with a population in excess of 3,000, 8 with a population in excess of 2,000, and 9 with a population in excess of 1,000.

The following is a list of the governors of Minnesota since the date of the admission of the state to the Union in 1857, together with their respective terms of service: Henry S. Sibley, 1857-58; Alexander Ramsey, 1858-63; Stephen Miller, 1863-65; William R. Marshall, 1865-69; Horace Austin, 1869-73; Cushman K. Davis, 1873-75; John S. Pillsbury, 1875-81; Lucius F. Hubbard, 1881-86; Andrew R. McGill, 1886-88;

William R. Merriam, 1888-93; Knute Nelson, 1893-95; D. M. Clough, 1895. See also MINNESOTA, Vol. XVI, pp. 475-477.

MINNESOTA, UNIVERSITY OF, a co-educational institution for higher education, located at Minneapolis; maintained and controlled by the state of Minnesota; founded in 1851 by territorial statute, and confirmed by the state constitution adopted in 1857. The school really was started under the charter of 1868, and opened in 1869.

The institution is under the control of a board of regents, consisting of nine members, appointed by the governor of the state for six years, and



LIBRARY, UNIVERSITY OF MINNESOTA.

three members *ex officio*,—the governor of the state, the superintendent of public instruction, and the president of the university. The endowment of the school originally consisted of 202,083 acres of land given by the Federal government, to be used or sold; the productive funds amount to about \$1,000,000 at present, which, supplemented by annual legislative appropriation, gives an income of \$225,000. There are faculties of science, literature and the arts; agriculture; engineering, metallurgy and the mechanical arts; law; medicine, dentistry and pharmacy. The geological survey of the state has been intrusted to the university since 1872, and through the state high school board the high schools are being affiliated with the university. In 1895 the library contained 40,000 volumes, the student body numbered 2,400, and there were 144 instructors. All departments are co-educational, and no honorary degrees are given.

MINNESOTA RIVER. See MINNESOTA, Vol. XVI, p. 475.

MINNEWAUKON or DEVIL'S LAKE. See DAKOTA, Vol. VI, p. 773.

MINONK, a city of Woodford County, northern central Illinois, 30 miles N. of Bloomington, on the Atchison, Topeka and Sante Fé and the Illinois Central railroads. Mining and agriculture are the principal occupations, and the city has a steam-mill, eight elevators, brickyards, tile-works and coal-mines. Population 1890, 2,316.

MINORCA. See BALEARIC ISLANDS, Vol. III, p. 278.

MINORITES. See FRANCISCANS, Vol. IX, p. 698.

MINOTAUR, a mythological monster. See MINOS, Vol. XVI, p. 478.

MINOT'S LEDGE, a part of Cohasset Rocks, a reef of Norfolk County, 15 miles E.S.E. of Bos-

ton, in lat. 42° 16' N., long. 70° 46' W. On it stands a granite lighthouse with a light showing 15 miles.

MINT, UNITED STATES. In the United States there are five mints—in Philadelphia (since 1793), New Orleans (1835), San Francisco (1854), Carson City and Denver—all under the charge of the Bureau of the Mint of the United States Treasury Department, and presided over by the Director of the Mint. Only the first three are in active operation, the other two are really assay-offices, and at Philadelphia alone all the authorized coins are struck. There the dies for all the mints are made. All dated or obverse dies must be destroyed at the close of each year. But individuals may get medals struck off for the cost of doing it. Besides the mints there are a number of assay-offices, established in Charlotte, North Carolina, 1835; New York, 1853; Boise City, Idaho, 1869; Helena, Montana, 1874; and St. Louis, 1881. The duty of these is to receive deposits of gold and silver, melt them down into bars, stamp these with their weight and proportions of the metals, and return to the depositor. The Bureau of the Mint has charge of all the mints and assay-offices, and in turn is under the Treasury Department. The head officer is the Director of the Mint. From 1891, when the gold coined was valued at \$24,172,203, the amount rose until 1894, when there was \$79,546,600 worth of coin. But this decreased in 1895 to \$43,933,475. On the other hand, silver, which was coined in dollars to the amount of \$38,272,020 in 1891, the year following the passage of the Sherman Act, was coined less and less until 1895, when only \$3,956,011 worth was coined. Besides this amount, however, there was subsidiary coin to the amount of \$1,166,936 in 1891, and \$5,113,470 (including \$2,511,058.25 World's Fair coins) in 1893. The total amount of copper, nickel and bronze coined from the founding of the mint to the end of 1895 amounted to \$27,535,142.79. See also Vol. XVI, pp. 480-491; and COINS, UNITED STATES, in these Supplements.

MINTO, WILLIAM, a Scottish author and editor; born in Aberdeenshire Oct. 10, 1845. He graduated with honors at Aberdeen University in 1865, and spent a year at Oxford. He acted for some years as assistant to Professor Bain of Aberdeen, and wrote two biographical and critical books, *Manual of English Prose Literature* and *Characteristics of the English Poets*; became editor of the now extinct *Examiner* in 1874; was next on the leader-writing staff of the *Daily News* and the *Pall Mall Gazette*. He was appointed professor of logic and English in the University of Aberdeen in 1880; wrote *Defoe* in John Morley's English Men of Letters Series (1879); and contributed to the *Nineteenth Century*, the *Fortnightly Review* and *Macmillan's Magazine*. He contributed many biographical sketches (see Index) to this *ENCYCLOPEDIA*, of which the more notable are CHAUCER, DICKENS, FIELDING, MILL J. S., SPENSER, and WORDSWORTH; and also wrote *Logic, Inductive and Deductive* (1893); and *Literature of the Georgian*

Era (1895), posthumously published. He died at Aberdeen, March 1, 1893.

MINUIT OR MINNEWIT, PETER, a Dutch colonist; born in Wesel, Rhenish Prussia, about 1580; removed to Holland; in 1625 was appointed director in New Netherlands; first governor of Manhattan Island, which he purchased from the Indians for about \$24; he built Fort Amsterdam; recalled in 1631 on account of the rapid extension of land grants; offered his services to the Swedish government, and in 1637 set sail from Gothenburg with a body of Swedish and Finnish colonists; planted his colony near the present city of Wilmington, the first permanent European settlement on the Delaware River. He died at Fort Christina, in 1641.

MINYAS, a mythical ancestral hero of the race of Minyæ, and son of Chryses. The accounts of his genealogy are contradictory, and he is called the son of two or three different personages. Likewise he is represented as the husband of a number of different wives. His children were Orchomenus, Periclymene, Leucippe, Arsinoë and Alcatos. His tomb was said to be Ochommos, in Boëtia.

MIOCENE PERIOD. See GEOLOGY, Vol. X, pp. 362-364.

MIOLAN-CARVALHO, MARIE CAROLINE, a French vocalist; born in Marseilles, Dec. 31, 1827. She received her musical education in Paris under Duprez, and after finishing at the Conservatoire made a tour of France with her instructor. On her return she made her *début* in *Lucia di Lammermoor*. In 1853 Mlle. Miolan married Carvalho, director of the Théâtre Lyrique, where she at once became prima donna. In 1859 she went to London, singing there until 1868, when she was secured to sing at the Paris Opera House, where she continued to sing, as well as at the Opera Comique, until her retirement. She was the original Marguerite in Gounod's *Faust*.

MIQUEL, JOHANN, a German statesman; born in Neuenhaus, Hanover, Feb. 21, 1828. He was educated at Heidelberg and Göttingen, and took up the practice of law at the latter place. In 1864 was elected deputy to the Hanoverian diet, and was chosen burgomaster of Osnabrück in 1865. It was due to his efforts that in 1866 the South German states entered into intimate relations with the North German Confederation. In 1870 he became director of the Diskontogesellschaft of Berlin; Burgomaster of Osnabrück again in 1876; of Frankfort-on-the-Main and a member of the House of Peers in 1880; entered the Reichstag in 1887, and became Prussian Minister of Finance in 1890.

MIQUELON ISLAND. See ST. PIERRE AND MIQUELON, Vol. XXI, p. 196.

MIRACLE PLAYS, MYSTERIES AND MORALITIES. See DRAMA, Vol. VII, pp. 413-415.

MIRACLES. See APOLOGETICS, Vol. II, p. 197.

MIRAGE. See LIGHT, Vol. XIV, p. 600; and FATA MORGANA, in these Supplements.

MIRAMICHI RIVER. See NEW BRUNSWICK, Vol. XVII, p. 373.

MIRANDA, CHRISTINE NILSSON, COUNTESS DE, a Swedish operatic singer; born in Wexio, Sweden, Aug. 3, 1843.

Her father was a peasant, and earned his living by playing music at fairs and festivities. While singing at a fair in 1857, she attracted the attention of a magistrate, who was impressed so much with her voice that he sent her to Stockholm and Paris to be educated. She made her *début* in Paris in 1864, in *La Traviata*, and sang in London in 1867. She visited



CHRISTINE NILSSON.

the United States in 1870 and 1871, and sang in opera, being received everywhere with the greatest enthusiasm. She was married in 1872 to M. Rouzaud, who died in 1882; married Count Casa de Miranda, a Spanish nobleman, in 1887; and retired from the stage the next year. She took the part of Elsa in *Lohengrin*, which, with Mignon and Margherita, was her favorite character. Her voice, while of moderate power, was remarkably sweet and even.

MIRIAM, sister of Moses, and eldest of the family. She is mentioned first as watching her brother's cradle. After the crossing of the Red Sea she becomes "Miriam the Prophetess"; takes the lead, with Aaron, in the complaint against Moses for his marriage with a Cushite, and for this was stricken with leprosy. This curse was removed, and she died toward the close of the wandering, being buried at Kadish.

MISERERE, the name by which, in Catholic usage, the Fiftieth Psalm of the Vulgate (51st in authorized version) is commonly known. It is one of the so-called "Penitential Psalms." The *Miserere* is of frequent occurrence in the services of the Roman Church, and is sung on each of the three evenings of Holy Week, different music being used on each occasion. The psalm is commonly supposed to have been written by David when rebuked by the prophet Nathan, but sometimes is attributed to Manasseh. For the architectural use of the term, see ARCHITECTURE, Vol. II, p. 467.

MISHAWAKA, a town of St. Joseph County, central northern Indiana, five miles E. of South Bend, on the Chicago and Grand Trunk and the Lake Shore and Michigan Southern railroads, and on St. Joseph's River. Wagons, carriages, plows and other farm tools, wind-mills, furniture, brushes, church organs, carvings and furnishings, refrigerators, wood-split pulleys, horse-collars, beer, wood-pulp, woollen goods and flour are made here. It is one of the oldest towns of northern Indiana. Population 1890, 3,371.

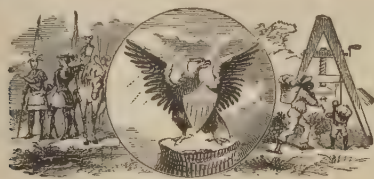
MISIONES, an Argentine territory lying between the Uruguay and the Paraná, and bounded

on all sides but the southwest by Brazil and Paraguay. Area, 20,823 square miles; population, 30,000, though before the expulsion of the Jesuits (1767) it exceeded 100,000. There are three low mountain chains radiating from the center. The greater portion of the surface is covered with forests, producing building and dye woods, oranges, medicinal herbs and the yerba maté. Maize is largely grown, and sugar-cane to some extent; of late years several sugar-houses have been erected. Capital, Posadas; population, 3,000. The eastern part of this territory has long been claimed by both Argentina and Brazil; it was agreed, in 1889, that in case the dispute could not be settled within a certain time by commissioners appointed, it should be referred to President Cleveland's arbitration. On Feb. 6, 1895, he awarded it to Brazil, fixing the international boundary on the rivers Pepiri-guaza and San Antonio. The area of the land awarded Brazil was 11,823 square miles; population, 7,000.

MISREPRESENTATION. See FRAUD, Vol. IX, p. 726; and DECEIT and FALSE PRETENSES, in these Supplements.

MISSION INDIANS, the tribes of American Indians which were gathered around the Californian mission houses. These missions were first established by Charles III of Spain, in 1767, and the Jesuits undertook to civilize and Christianize the Indians in California. Junipero Serra was the prime mover and heart of the enterprise, and the good results were due largely to him. The origin of the Indians of the country is not known, but they were of a more docile nature than the neighboring tribes, and took naturally to agriculture and peaceful pursuits. The present Mission Indians are composed mostly of branches of the Shoshone and Yuman stock of Indians, and live in southern California.

MISSISSIPPI has an area of 46,810 square miles, of which 470 are water surface, and 46,340, or 29,-



SEAL OF THE STATE OF MISSISSIPPI.

657,600 acres, are land surface. In 1890 the population was 1,289,600,—an increase of 158,003 since 1880,—a growth of 13.96 per cent. The rank among the states in 1880 was eighteenth; that of 1890, twenty-first; the density of population at the first-mentioned date being 24.42 to the square mile, at the latter date, 27.83. In 1890, 34,098 citizens of the state resided in the three cities, the per cent of urban population being but 2.64 of the whole, the smallest, in this respect, of that of any state in the Union. The division among the sexes in 1890 was 649,687 males and 639,913 females; the percentage of native-born population was 99.38, and the number of negroes 742,559,—an increase since 1880 of 92,268.

Agriculture has received a great stimulus in the time intervening since 1880, prior to which time cotton was the chief staple and engaged the attention of fully three fourths of the agriculturists of the state. Up to the date mentioned scarcely enough of the staple products was raised for home-consumption, and it became apparent that this specialization of agriculture must be done away with, and efforts made to diversify it by growing other crops to which the soil and climate were equally well suited. In 1890, Mississippi had advanced in this direction to a point where 1,842,774 acres were devoted to the cereals, and 27,531,768 bushels produced. Of this area, 92.60 per cent was devoted to the culture of Indian corn, .14 to wheat, 7.24 to oats, and .02 to rye. The crop of Indian corn for 1889 was 26,148,144 bushels, which had increased in 1894 to 36,000,000 bushels. Wheat-raising is receiving much attention at the hands of farmers, and in many sections of the state the crop can be harvested early in June, allowing a crop of corn to mature in time to plant the same land again in wheat in November. The eleventh census reports gave the number of farms in Mississippi at 144,318,—an increase from 101,772 in 1880. The total acreage was 17,572,547,—an increase of almost two million acres for the ten years, and the percentage of improved lands had risen from a little over thirty per cent to almost forty per cent in the same time. The estimated value of all lands, fences, buildings, implements, machinery and livestock had risen from \$122,016,268 in 1880 to \$167,328,457 in 1890. The number of horses in the state at the latter date was 155,050; mules and asses, 156,755; neat cattle, 914,778 (which included 310,159 milch cows); swine, 1,163,141; and sheep, 451,779, from which were sheared 1,038,186 pounds of wool. Notwithstanding the advances made in branches of agriculture other than cotton-raising, Mississippi did not fall off in the production of cotton in 1889, the year from which the census figures were gathered. In 1879 the acreage was 2,106,215, which had increased in 1889 to 2,883,278,—a gain of 777,063 acres, the production also having increased from 963,111 bales to 1,154,725 bales,—a gain of 191,614 bales. The acreage devoted to cotton in 1889 was equal to 9.72 per cent of the entire land-area of the state,—a proportion exceeded only by South Carolina. Every county in the state but one produces more or less cotton, the exception being Jackson County, in the extreme southeastern portion, bordering on the Gulf of Mexico. The total value of the crop of cotton of 1889 was, in round numbers, \$51,000,000 to the producers.

Other products of the soil are grasses and forage plants of all kinds, while the yield of hay per acre is greater than that of Illinois, Iowa or Kansas, and considerably in excess of the average yield for the United States. Oats, rye and barley are becoming more extensively grown, and make the best of winter grazing. Rice is an important grain crop in the southern part of the state, where the yield is from twenty to thirty bushels per acre. Sorghum is grown largely in the northern part of the state, and thousands of barrels are shipped annually to the mar-

kets of the North. In the central and southern portions, sugar-cane is grown on almost every farm, the yield being from 300 to 400 gallons per acre, often realizing as much as \$200 per acre to the farmer. Hemp is receiving much attention, and a factory for working it has been erected near Greenville. Irish potatoes do well, and sweet potatoes, especially the yellow yam, give large returns. Cattle-raising is a profitable industry, and the mild climate and winter grasses combine to give the stockmen a great advantage over those engaged in the same business in more northerly sections of the country. Creameries have been established in many parts of the state, and have proved to be paying investments. Sheep subsist wholly on grass the entire year, and the cost of producing wool is accordingly reduced far below that known to the Northern sheep-raiser. All kinds of small fruits and vegetables, as well as orchard products, grow prolifically, and shipments to the Northern markets have proved one of the most profitable industries. Shipments of tomatoes were made from Mississippi to Chicago as early as 1866, and by a gradual growth the business has become one of immense proportions. Apples, pears, peaches, plums, grapes, strawberries, tomatoes, early potatoes, cucumbers and many other similar products are now shipped to many Northern cities, and realize handsome profits to the growers. The railroads have established fast trains and equipped them with refrigerator-cars, thus placing the shipments in distant places in short time and good order.

In 1890, Mississippi had 1,698 specified manufacturing industries, in which capital to the amount of \$14,896,884 was invested, 15,817 persons were employed, whose annual wages aggregated \$4,913,863, and from which came finished products to the value of \$18,705,834. The leading industries were lumber and other mill products, which, with other forms of lumber and timber, approximated \$6,000,-

nut, butternut (or white walnut), dog-wood, black gum, beech, sycamore, cottonwood, magnolia, locust and hickory. Among the evergreens, of which there are still large virgin forests, are the long and short leaved pine, pitch-pine and cypress.

The fisheries of the state afford a large revenue, oysters leading, with an annual yield of about one million bushels, of the value of about \$150,000. Along the gulf coast, the bays, rivers and bayous are stocked with many varieties of fresh and salt-water fish, the canning of which has become a large industry, shipments being made to all parts of this country, as well as to European points. Crabs abound the year around, and furnish a cheap and wholesome food.

June 8, 1895, the 64 state banks of Mississippi reported resources and liabilities to the amount of \$11,022,537, and individual deposits aggregating \$6,055,440. The loans and discounts amounted to \$6,056,435.

In 1895 there were 2,467 miles of railroad within the state, on which the several lines paid a privilege tax of \$37,244. In addition to this, the state tax, assessed on a valuation of \$24,204,469, amounted to \$221,028. In 1894-95 there were 25 miles of new road built, and the roads of the state were in a flourishing condition generally. The numerous waterways of Mississippi add largely to the facilities for transportation. The Mississippi and Pearl rivers form the western boundary, and from the former there are a large number of branches which intersect the delta region so completely that in that section of the state there are few plantations which are not within the reach of a navigable stream. During a portion of the year the Pearl River is navigable as far north as Jackson, and boats from Mobile ascend the Tombigbee as far as Columbus. Hundreds of vessels are engaged in the carrying-trade along the gulf coast, and Biloxi is fast becoming an important shipping-point, having one of the best natural harbors on the coast.

From a school census taken in 1894 it was ascertained that the number of children within the school age of 5 to 21 in the state was 542,531; number enrolled in the public schools, 350,615; daily average attendance, 202,683; number of public schools, 6,264; number of teachers employed, 7,855; value of school property, \$1,636,055; total revenue for the public schools, \$1,433,766; amount expended for the public schools for the year, \$1,276,501; amount expended for state educational institutions, \$126,826; total amount expended by the state for educational purposes, \$1,403,327. Within the ten years (1885-95) there was an increase in the number of children enrolled, of 69,572,—an increase in the daily attendance of 18,864; in the number of schools taught, of 615; in the average length of the school year, of 29 days; in the number of teachers, of 1,003; in the number of schoolhouses built, of 2,396; in the amount of annual expenditures for school purposes, of \$474,025. The enumeration revealed the fact that there were 100,000 more negro children than white. In addition to the public schools, there were 480 private schools, attended by 21,203 pupils. Other educational institutions to which the state



STATE CAPITOL BUILDING, JACKSON, MISSISSIPPI.

000. Cotton goods amounted to \$1,333,398, flouring and grist mill products amounted to \$1,249,669, cars and general shop construction reached a total of \$1,329,549, and oil, cottonseed and cake yielded a return of \$2,406,628.

The state is especially rich in timber; the leading varieties being the red oak, the scarlet, the black, the willow, the chestnut and the water-oak, in the central and northern portions of the state, while black-jack is found on all poor lands in all portions of the state. Other varieties of timber are the wal-

gives financial aid are the University of Mississippi (q.v., in these Supplements), the Agricultural and Mechanical College, Industrial Institute and College, Holly Springs State Normal College (for negro youths). The Methodist Episcopal Church maintains two institutions,—one at Holly Springs, known as Rust University, and the other at Jackson, known as Millsaps College. The Baptist Church has Mississippi College, at Clinton. A non-sectarian institution known as the Cooper-Huddleston College is operated at Daleville. Alcorn Agricultural and Mechanical College, also for negro youth.

Among the state charitable, educational and correctional institutions are the State Lunatic Asylum, at Jackson, costing the state \$95,000 for 1895, and having had, for the year, an average of 707 patients; the East Mississippi Insane Asylum, at Meridian, costing the state about \$21,000 per annum, and having had, for the year 1894, an average of 245 patients; the Deaf and Dumb Institute, at Jackson, costing for maintenance \$22,829 in 1895; the Institute for the Blind, costing near \$10,000 in 1895; the Vicksburg Hospital and the Natchez Hospital, the aggregate cost of maintenance being close to \$15,000.

At the beginning of 1895, reports were made relative to the finances of the state, showing that the assessed valuation of the real estate amounted to \$113,409,558, the personal property \$39,082,291, and the railways and telegraph lines of the state \$24,820,320, making a total assessable valuation of \$177,312,169. The receipts from all sources for the year ending Sept. 30, 1895, were \$1,277,142, and the expenditures for the same period were \$1,369,994, leaving a deficit of \$92,811. The total indebtedness of the state was \$3,241,354, a portion of which was never to become payable, the interest only becoming due. After deducting these sums from the gross indebtedness there is left but \$261,908 actually due and payable.

In 1895 the church statistics of Mississippi were as follows:

DENOMINATIONS.	ORGANIZATIONS.	BUILDINGS.	MEMBERS.	VALUE OF BUILDINGS.
Presbyterian -----	228	204	12,430	\$426,290
Baptist -----	1,611	2,619	222,680	1,408,732
Episcopalians -----	68	63	3,560	322,960
Methodist -----	1,855	1,866	163,169	1,644,869
Universalist -----	3	3	120	800
Congregational -----	35	34	1,551	12,375
Jewish -----	6	6	1,370	64,000
Roman Catholic -----	67	67	11,348	321,525
All others -----	114	112	5,812	55,672
Total -----	3,987	4,974	422,040	\$4,257,223

On Jan. 1, 1896, there were 194 newspapers of all kinds published in Mississippi. Papers were published in all the 75 counties, in 109 cities, towns and villages, and in 71 of the county seats. Of the entire number of papers, 8 were daily, 1 triweekly, 2 semiweekly, 175 weekly, 1 fortnightly, 2 semi-monthly and 5 monthly.

By the terms of the constitution adopted in 1890, the lease system of dealing with the labor of state convicts was abolished, to take effect on and after

Jan. 1, 1895. The commission of five appointed in 1894 made purchases of land for the purpose of forming state farms to be worked by the convicts under state supervision; 3,207 acres were purchased in Rankin County, 2,725 in Hinds County, and 2,005 acres in Holmes County, making, in all, 7,237 acres, for which \$64,638 were paid. The total number of convicts on hand Sept. 30, 1895, was 990. The value of the farm products for 1895 amounted to \$155,000; the expenses of producing the same aggregated \$95,000. The total expenditures of the institution for the fiscal year ending Sept. 30, 1895, were \$213,355.

The National Guard of Mississippi aggregated, in 1895, 1,735 officers and men. The force is formed into a brigade, consisting of three regiments, and a cadet battalion of infantry, a battalion of cavalry and a battalion of artillery, attached to an infantry regiment. The state appropriation for 1895 was \$3,600; the Federal appropriation for the preceding year, \$7,763.

The following are the principal cities of the state, with their population according to the census of 1890: Vicksburg, 13,373; Meridian, 10,624; Natchez, 10,101; Greenville, 6,658; Jackson, 5,920; Columbus, 4,559; Aberdeen, 3,449; Yazoo City, 3,286; Biloxi, 3,234; Wesson, 3,168.

Feb. 5, 1890, the legislature passed an act, by the terms of which the governor was to issue a proclamation and call an election for the purpose of choosing delegates to a constitutional convention. The proclamation was issued, directing the election to be held July 29th, and 14 delegates at large and 120 by districts were elected, and assembled August 12th, continued in session 72 days, adjourning November 1st. The principal features of the new constitution were the following:

1. The government was divided into three departments—executive, legislative and judicial.
2. The legislature should meet biennially, alternating regularly with special sessions, the latter to be held for the purpose of considering appropriation and revenue bills only, except in cases of emergency to be decided by the governor.
3. Senators and representatives were to be elected for four years.
4. The governor should thereafter be elected for four years, and be ineligible to become his own immediate successor. He should have the right of vetoing appropriation bills.
5. The office of lieutenant-governor was abolished, and the president of the senate was to become the successor of the governor in the event of a vacancy. The speaker of the house of representatives was to come next in succession.
6. Separate schools for children of the white and colored races were to be maintained.
7. Marriages contracted between white persons and negroes (or mulattoes) were to be void.
8. Married women were given the same rights in the management of their own property as possessed by a *feme sole*.
9. The right of suffrage was extended to "every male inhabitant of the state, (except idiots, insane persons and Indians not taxed), who is a citizen of the United States, 21 years old and upward, who has resided in the state two years and one year in the election district, or in the incorporated city or town, in which he offers to vote, and who is duly registered, * * * * * and who has never been convicted of bribery, burglary, theft, arson, obtaining money or goods under false pretenses, perjury, forgery, embezzlement or bigamy, and who has paid, on or before

the first day of February of the year in which he shall offer to vote, all taxes which may have been legally required of him, and which he has had an opportunity of paying according to law, for the preceding year, and who is not delinquent for any taxes of the year next preceding, and who shall produce to the officers holding the election satisfactory evidence that he has paid said taxes. On and after the first day of January, 1892, the following qualifications are added to the foregoing: Every qualified elector shall be able to read any section of the constitution of the state, or he shall be able to understand the same when read to him, or give a reasonable interpretation thereof."

As no general election of the principal state officers was provided for until November, 1895, an ordinance was passed extending until Jan. 1, 1896, the terms of office of the governor, lieutenant-governor, secretary, treasurer, auditor, attorney-general and superintendent of education. The constitution was promulgated as that of the state of Mississippi on and after Jan. 1, 1891, without submitting it to the people.

The following is a list of the governors of Mississippi into 1817, the date of admission of the state into the Union: David Holmes, 1817-19; George Poindexter, 1819-21; Walter Leake, 1821-25; Gerard C. Brandon, 1825; David Holmes, 1825-27; Gerard C. Brandon, 1827-31; Abram M. Scott, 1831-33; Fountain Winston, 1833-34; Hiram G. Runnels, 1834-36; Charles Lynch, 1836-38; Alexander G. McNutt, 1838-42; Tilgham M. Tucker, 1842-44; Albert G. Brown, 1844-48; Joseph W. Mathews, 1848-50; John A. Quitman, 1850-51; John Isaac Guion, 1851; James Whitfield, 1851-52; Henry S. Foote, 1852-54; John J. MacRae, 1854-57; William McWillie, 1857-60; John J. Pettus, 1860-62; Jacob Thompson, 1862-64; Charles Clarke, 1864-65; William L. Sharkey, 1865; Benjamin G. Humphreys, 1865-68; Adelbert Ames, 1868-70; James L. Acorn, 1870; R. C. Powers, 1870-74; Adelbert Ames, 1874-76; John M. Stone, 1876-82; Robert Lowry, 1882-90; John M. Stone, 1890-96; A. J. McLaurin, 1896. See also MISSISSIPPI, Vol. XVI, pp. 521-524.

MISSISSIPPI, UNIVERSITY OF, an institution of higher learning, located in Lafayette County, Mississippi. It was chartered in 1844, but was not opened till 1848. The endowment up to 1894 consisted of the proceeds from the sale of a township of land given to the state by Congress. The state pays six per cent interest on this, and the income amounts to \$36,000, including all charges from tuition, etc. In 1894 Congress granted another township of land. There are 12 university buildings and a library containing 14,000 volumes. The instruction is open to both men and women, three courses of study being offered to them: arts, science and philosophy. There were, in 1895, about 250 students and 16 instructors.

MISSISSIPPI SCHEME. See FRANCE, Vol. IX, p. 584.

MISSOULA, a city, and important lumber and ranching center, and the capital of Missoula County, northwestern Montana, 95 miles N.W. of Butte, on the Missoula River, and on the Northern Pacific railroad. Population 1890, 2,420.

MISSOURI, according to the latest corrected surveys, has an area of 69,415 square miles, of which 680 square miles are water surface. The area is almost twenty thousand square miles greater than that

of the state of New York, greater than all of the New England states, with Delaware added, and almost exactly the same as that of the state of Wash-



SEAL OF THE STATE OF MISSOURI.

ington. The population in 1890 was 2,679,184, the percentage of increase from 1880 having been 23.56. Of the inhabitants of the state, 703,743 lived in the eight cities, constituting 26.27 per cent of the entire population. The males numbered 1,385,238; the females, 1,293,946. The number of people to the square mile was 38.98; the percentage of native-born citizens was 91.23; of foreign-born, 8.77; the number of negroes, 150,184,—a decrease of 4,834 since 1880. Missouri retained the same relative rank among the states, in the matter of population, at the time of the eleventh decennial census that was held at the time of the tenth,—that of fifth.

The state stands high in the production of the cereals, as will be shown by the following deductions from the last census:

Acres devoted to the cereals.....	9,724,201
Rank in area among the states.....	Fifth
Production of the cereals, in bushels.....	267,305,096
Rank in production among the states.....	Fifth
Acres devoted to corn.....	6,072,121
Rank in area among the states.....	Fourth
Bushels of corn produced.....	196,999,016
Rank in production among the states.....	Fifth
Acres devoted to wheat.....	1,946,785
Rank in area among the states.....	Eighth
Bushels of wheat produced.....	30,113,821
Rank in production among the states.....	Seventh
Acres devoted to oats.....	1,676,706
Rank in area among the states.....	Third
Bushels of oats produced.....	39,820,149
Rank in production among the states.....	Eighth

In barley, rye and buckwheat the relative production is not so high, but the area under cultivation and the production of each was large. During the ten years from 1880 to 1890 Missouri added 1,572,568 acres to her meadow-lands to be mown for hay. The rank in the production of flax was sixth; in the production of hemp, fourth. In tobacco the rank was ninth, the number of acres under cultivation being 11,350, from which 9,424,823 pounds were raised. The number of farms was 238,043; the number in 1880 having been 215,575; the average size, 129 acres, and the total farm area, 30,780,290. The total value of the lands, fences, buildings, implements, machinery and live-stock was \$786,390,235,—a gain, for the ten years, of almost \$300,000,000. The number of horses was 946,401; of mules, 245,273,—giving the state the rank of first in that connection; neat cattle, 2,969,716; sheep, 950,562, from which 4,040,084 pounds of wool were shorn. The state stood third in the total number of swine, having 4,987,432, and first in the number slaughtered by farmers for their own use, 1,093,711. The total

value of all farm products for the year was estimated at \$109,751,024. Agriculture is constantly receiving more intelligent attention from the farmers of Missouri, and organizations for the dissemination of agricultural knowledge are maintained throughout the state. In 1894 there were Farmers' Institutes held in 86 of the counties of the state, to which the farmers in attendance gave an extended interest. The state is divided into 15 districts, for each of which the governor appoints an official, who, together with the governor, the superintendent of public schools and the dean of the agricultural college, constitutes the state board of agriculture. Stock-breeders' associations also are maintained, and the proceedings of all associations are published and distributed to the farmers of the state. Horticulture is receiving much attention, as the state is well situated for this branch of agricultural industry. Missouri stands third in the production of grapes and wine, while apples, peaches, pears, plums, cherries and other small fruits flourish as nowhere else in the great Mississippi valley.

Reports made by the United States Department of Agriculture for 1895 show the following in regard to the principal crops of Missouri: Corn, 6,613,118 acres; 238,072,248 bushels; value, \$47,614,450. Wheat, 1,541,664 acres; 18,499,968 bushels; value, \$9,434,984. Oats, 1,102,805 acres; 30,547,699 bushels; value, \$5,498,586. Hay, 2,329,731 acres; 2,725,785 tons; value, \$18,535,338. Including with the above rye and potatoes, of which latter 10,765,276 bushels were produced, the total value of farm products of the year amounted to \$83,870,708.

The specified manufacturing industries of Missouri at the time of the eleventh decennial census amounted in number to 14,052; the capital invested was \$189,558,546; the number of persons employed was 143,139, to whom \$76,417,364 were paid as wages for the year; and the finished products amounted in value to \$324,561,993. Among the leading industries reported were flouring and grist mill products, which amounted to \$34,486,795; malt liquors, \$16,954,137; tobacco, chewing, smoking and snuff, \$15,428,764; slaughtering and meat-packing, wholesale, \$14,789,012; foundry and machine-shop products, \$13,680,773; and clothing manufacturing, which, in its different branches, yielded a sum in excess of \$15,000,000. The collections of internal revenue for the state for the fiscal year ending June 30, 1895, amounted to \$7,830,900, in addition to which tobacco manufacturers bought special stamps for tobacco of the value of \$3,461,653. The 878 cigar manufactories of the state made 65,420,772 cigars and 1,194,800 cigarettes. Ninety-two other factories had an output of 51,948,338 pounds of plug-tobacco, 85,057 pounds of fine-cut, 5,569,077 pounds of smoking-tobacco, and 26,012 pounds of snuff. Sixty-nine distilleries were in operation during the year, and the amount of distilled spirits gauged amounted to 8,598,080 gallons.

In 1895 the production of coal was about 2,250,000 tons, of a value of nearly \$2,700,000, giving employment to 8,000 people. About 2,500 tons of coke were made, almost all of which was used by the zinc-smelting works. The coal produced was from

402 mines, located in 34 of the counties of the state. Zinc to the amount of 101,294 tons was produced in 1895, having been increased gradually from 960 tons in 1873, at which date the product was of the value of \$8,000, that of 1895 being \$1,707,665. The total production of lead and zinc for the fiscal year ending June 30, 1895, was of a value of \$3,560,066, of which amount \$1,847,049 came from 47 mines reporting in the single county of Jasper. The yield of the granite-quarries for 1895 was \$100,000,—a decline from \$400,000 three years previous. The yield of sandstone and limestone in 1895 was approximately \$750,000 in the aggregate; brick, tile, sewer-pipe and miscellaneous articles of clay exceeded \$2,600,000. The iron industry was in a poor condition, from a decline in prices, and the mines reported only 100,000 tons. Pig-iron also fell off, the product in 1893 being 30,000 long tons, that of 1895, but 6,000 tons.

The equalized taxable valuation of the property of the state, as a basis for taxation in 1895, was \$994,589,787. The valuation has increased steadily since 1887, amounting, in round numbers, to \$231,000,000. The tax rate in 1895 was 25 cents on the \$100. The total taxes received by the state in 1894 was \$2,006,201 for the revenue fund and \$1,031,043 for the interest fund. Jan. 1, 1895, the total debt of the state amounted to \$10,354,958, of which \$6,016,000 was bonds and \$4,338,958 was certificates of indebtedness outstanding. The balance remaining in the treasury was \$719,725.

The school fund of Missouri amounted on the first day of January, 1896, to \$12,283,491. The



STATE CAPITOL BUILDING, JEFFERSON CITY.

expenditures for the preceding year had been \$6,451,878, of which \$4,063,616 was for teachers' salaries. The total number of persons in the state within the school age of 6 to 20 years was 944,935, of which 893,566 were white and 51,369 negroes. The state is divided into 9,424 school districts, the total number of pupils enrolled being 644,577, and the number of teachers 14,487, of whom 737 were negroes. The number of schoolhouses erected during the preceding year was reported at 269. The school libraries contained 220,510 volumes. There were enrolled in private schools, according to the report of the superintendent of the public schools, 20,073 pupils, 1,190 teachers employed, and 167,576 volumes in the several libraries. The county institutes of the state had 10,253 teachers enrolled as students during the year, the cost to the state being

\$30,663; 22 institutes for negro teachers were held, 379 students attended and 358 certificates were recommended. The high schools of the state had 10,650 pupils enrolled during the school year 1894-95 and at the middle of the year 1895-96, 11,501. The state seminary funds expended for the State University in 1895 amounted to \$101,502. Three state normal schools are maintained, one at Kirksville, one at Warrensburg and one at Cape Girardeau, the cost to the state being almost \$25,000 each annually, the aggregate expenditures since 1871 reaching \$835,000. Within the same period the state has given aid to the Lincoln Institute to the amount of \$218,000, and since 1875 to the School of Mines and Metallurgy, \$203,514. Other and higher institutions of learning in Missouri are many, and, without exception, flourishing. Of the educational institutions of the northwest, Missouri College at Albany, Central College at Fayette, Morrisville College at Morrisville, Scarritt Collegiate Institute at Neosho, and St. Charles College at St. Charles are under the control of the Methodist Episcopal Church South. Carthage Collegiate Institute at Carthage, Westminster College at Fulton, Presbyterian College of Upper Missouri at Lawson, and Park College at Parkville are under the control of the Presbyterian Church. Central Wesleyan College at Warrenton and Missouri Wesleyan College at Cameron are controlled by the Methodist Episcopal Church. Central Christian College at Albany and Christian University at Canton are controlled by the Christian Church. Southwest Baptist College at Bolivar, La Grange College at La Grange, and William Jewell College at Liberty are under the control of the Baptist Church. St. Vincent's College at Cape Girardeau, Christian Brothers' College at St. Louis, and St. Louis University in the same city are all conducted by the Catholic Church. The Cumberland Presbyterian Church has Ozark College at Greenfield and Missouri Valley College at Marshall. The Christian Union Church has Grand River Christian Union College at Edinburg. The Congregational Church has Drury College at Springfield. The United Presbyterian Church has Tarkio College at Tarkio; and the United Brethren Church has Avalon College at Trenton. Five non-sectarian institutions are conducted, one at Bowling Green, known as Pike College; the University of the State of Missouri, at Columbia (q.v., in these Supplements); Pritchett School Institute, at Glasgow; Western College, at La Belle, and Washington University, at St. Louis.

The number of church organizations was 8,064; the number of communicants, 735,839; the value of all church property, \$19,663,737. The leading denomination in point of number of organizations was the Methodists, all bodies, 2,412; followed by the Baptists, all bodies, with 2,355; Disciples of Christ, 1,120; Presbyterians, 776; and Catholics, 441.

During the year 1895 the state penal and eleemosynary institutions were embarrassed by the lack of sufficient funds to secure their proper maintenance. The appropriations since that time have been ample to provide for all necessary expenditures. The following are the principal charitable,

educational and penal institutions, their location, and cost of maintenance for the years 1893 and 1894:

School for the Blind, St. Louis, \$59,297.
Lunatic Asylum No. 1, Fulton, \$182,017.
Lunatic Asylum No. 2, St. Joseph, \$203,255.
Lunatic Asylum No. 3, Nevada, \$153,737.
St. Louis Insane Asylum, St. Louis, \$84,166.
Missouri Penitentiary, Jefferson City, \$90,160.
Reform School for Boys, Boonville, \$69,490.
Industrial Home for Girls, Chillicothe, \$14,960.
School for the Deaf and Dumb, Fulton, \$118,996.

In addition to the liberal maintenance afforded the poor and unfortunate in the above charitable institutions, there was the sum of \$573,610 expended in 1895 for the support of those persons who were not inmates of the same, but who were maintained at the expense of the several counties of the state.

Including main lines and branches, there were, in Missouri, June 30, 1895, 143 railroads, controlled and operated by 50 companies. The report of the railroad commissioners gives the following facts: Mileage of main line, 6,564.69, increase within the preceding year 39.38 miles; second, third and fourth tracks, main line, 103.70 miles, increase 25.46 miles; sidings, 1,511.38 miles, increase 51.39 miles. In 1852 there were but five miles of railroad in the state. The year of the greatest amount of construction was 1871, when 580 miles of track were laid. The increase in mileage since 1875, the year in which the railroad commission was established, has been 3,514 miles, or an average of 184.9 miles per year.

The state banks numbered 482 on April 3, 1895; their combined capital was \$20,000,000; resources, \$102,000,000; deposits, \$68,000,000. There were 94 private banks, with a reported capital in excess of \$1,000,000; resources, \$8,000,000; and deposits, \$6,000,000. There were, also, 76 national banks, with combined capital of about \$23,000,000. The aggregate banking capital of all institutions was \$46,500,000; the deposits amounted to \$127,900,000, and the total loans and discounts, \$122,000,000.

The National Guard of Missouri consisted, in 1895, of one brigade, composed of 4 regiments of infantry and 2 batteries, aggregating 2,134 men. The legislative appropriations for the support of the military averages about \$20,000 annually. Brigade and regimental encampments are usually held annually, and the guard is in a high state of efficiency.

The principal cities of the state, with their population in both 1880 and 1890, are given herewith:

	1890.	1880.
St. Louis.....	451,770	350,518
Kansas City.....	119,668	55,785
St. Joseph.....	52,324	32,431
Springfield.....	21,850	6,522
Sedalia.....	14,068	9,561
Hannibal.....	12,857	11,074
Moberly.....	8,215	6,070
Carthage.....	7,981	4,167
Joplin.....	9,943	7,038
Independence.....	6,380	3,146
St. Charles.....	6,161	5,014
Chillicothe.....	5,717	4,078
Jefferson City.....	6,742	5,271
Nevada.....	7,262	1,913

Jan. 1, 1896, there were 948 newspapers of all kinds published in Missouri. Papers were published in all the 114 counties, in 389 cities, towns and villages, and in 112 county seats. Of the whole number of papers, 83 were daily, 2 triweekly, 15 semiweekly, 732 weekly, 2 fortnightly, 14 semimonthly, 88 monthly, 1 bimonthly and 11 quarterly.

The following is a list of the governors of Missouri since 1821, the date of the admission of the state into the Union, together with their respective terms of office: Alexander McNair, 1820-24; Frederick Bates, 1824-25; Abraham J. Williams, 1825; John Miller, 1825-32; Daniel Dunklin, 1832-36; Lilburn W. Boggs, 1836-40; Thomas Reynolds, 1840-44; M. M. Marmaduke, 1844; John C. Edwards, 1844-48; Austin A. King, 1848-52; Sterling Price, 1852-56; Trusten Polk, 1856-57; Hancock Jackson, 1857; Robert M. Stewart, 1857-61; Claiborn F. Jackson, 1861; Hamilton R. Gamble, 1861-64; Willard P. Hall, 1864-65; Thomas C. Fletcher, 1865-69; Joseph W. McClurg, 1869-71; B. Gratz Brown, 1871-73; Silas Woodson, 1873-75; Charles H. Hardin, 1875-77; John S. Phelps, 1877-81; Thomas T. Crittenden, 1881-85; John S. Marmaduke, 1885-87; Allen G. Morehouse, 1887-89; David R. Francis, 1889-93; William J. Stone, 1893-97; L. V. Stephens, 1897. See also MISSOURI, Vol. XVI, pp. 524-527.

MISSOURI, UNIVERSITY OF, a non-sectarian institution of learning established at Columbia, Mis-



UNIVERSITY OF MISSOURI.

souri, in 1840. The endowment, amounting to about \$1,200,000, is held by the state, which pays interest on the amount and makes further appropriations when necessary. There are six departments: 1. Normal School; 2. College of Agriculture and Mechanic Arts; 3. School of Mines and Metallurgy, located at Rolla; 4. School of Law; 5. School of Medicine; 6. Engineering Department. The state experiment station was added in 1887. The campus, together with its buildings and the farm, is valued at \$1,000,000. There were, in 1895, about 600 students of both sexes and 60 instructors. The library contains 23,000 volumes.

MISSOURI COMPROMISE. See UNITED STATES, Vol. XXIII, pp. 761, 772.

MISSOURI RIVER. See MISSISSIPPI, Vol. XVI, pp. 518, 519.

MISSOURI VALLEY, a town and a railroad junction of Harrison County, central western Iowa, 21 miles N. of Council Bluffs, on Willow River and on the Chicago and North-Western and the Sioux

City and Pacific railroads. It has railroad machine-shops employing four hundred men, stock-yards, besides a carriage factory, a stove foundry, flour-mills and brick and tile works. The town is furnished with electric lights and a good water-supply, and has large fair grounds. Population 1890, 2,797; 1895, 3,350.

MISTAKE IN LAW. It is a general rule of law that when one does an act through a mistake as to his legal rights, he will not, for that reason, be relieved from the consequences of his act. It would be otherwise if the person benefited by the mistake knew that the first person was proceeding under a mistake of law and, permitted him to continue under the mistaken belief. The ground of relief in such case, however, would be fraud rather than the mistake. An act done under a mutual mistake of fact will avoid the consequences of the act. The same rule will apply when one party has suppressed the truth, while the other acted under a mistaken belief as to the fact. But to entitle one to relief because of mistake of fact, the mistake must be concerning some material fact which was, in part at least, the cause of the act. If a mistake as to some fact in a contract is on the part of only one of the parties thereto, as a general rule no relief can be afforded if the acts of the other party were free from fraud. Courts of equity alone have jurisdiction to grant relief from the consequences of an act done through mistake; but if a mistake is so obvious from an inspection of a contract without extrinsic evidence as to leave no doubt of the intention of the parties, a court of law may construe the contract so as to correct the mistake. The rules as to mistake of law and of fact are similar to those applying in case of ignorance of law or fact. See also IGNORANTIA JURIS, and IGNORANTIA FACTI, in these Supplements.

MISTASSINI, LAKE, in Labrador, 300 miles N. of Quebec, is, strictly speaking, an expansion of the river Rupert, which flows into the southern extremity of Hudson Bay. It is 100 miles long from N.E. to S.W., by 12 in average width. Game and fish are plentiful in this region.

MISTRAL. See METEOROLOGY, Vol. XVI, p. 149.

MISTRAL, FRÉDÉRIC, a Provençal poet, son of a peasant, was born Sept. 8, 1896, at Maillane, department of Bouches-du-Rhône; educated at Nyons and Avignon, and was licensed to practice law; at Foix, in 1854, he, Roumanille, the printer Aubanel and six others, founded a society for the restoration of the Provençal language to literary use, which is now known as the *Félibrige*. (See *FÉLIBRES*, in these Supplements.) He was then known for his fugitive pieces in that dialect, but in 1859 he published *Mirèio* (*Mirèille*), a metric epic of Midi life, that awakened the Provençal heart, and won a medal valued at \$400 from the French Academy in 1861. It was turned into a libretto for an opera by Gounod, and exists in a French rendering by Mistral himself, and an English translation by Harriet W. Preston (1872). Mistral also obtained the Halphen prize in 1884 from the French Academy, and a prize of \$2,000 from the Academy of Inscriptions and Fine Arts in 1890. He was decorated with the Legion of Honor cross in 1863. Other works of his are *Cal-*

endeau (1867); *Les Îles d'Or* (1875); *Nerto*, a novel (1884), and *La Reine Jeanne*, a tragedy (1890); and of these works he made both French and Provençal versions. He made a Provençal-French dictionary (*Low Tresor dou Felibrige*), embracing several Languedoc dialects. He was also a contributor to *Revue Félibriennes*.

MITCHEL, JOHN, an Irish Nationalist; born in Dungiven, County Derry, Ireland, Nov. 3, 1815. He graduated at Trinity College, Dublin, and practiced law for several years. In 1845 he became a contributor to the Irish National newspapers. In May, 1848, he was convicted of high treason on account of his writings and speeches, and was sentenced to 14 years' banishment. He was kept one year in Bermuda and then transferred to Van Diemen's Land. From that country he escaped in the summer of 1853. He landed in San Francisco, and afterward resided in New York. There he published his *Jail Journal*, a narrative of his imprisonment. He established a paper called *The Citizen*, in which he defended human slavery, and through this, and a controversy with the archbishop of New York, his paper failed. He edited, unsuccessfully, *The Southern Citizen*, in Knoxville, Tennessee, and during the Civil War edited the Richmond *Enquirer*. After the war he resumed newspaper-work in New York. He returned to Ireland in 1874, and was elected to Parliament, but was not allowed to take his seat. He was the author of several works; among them, *The Last Conquest of Ireland (Perhaps)* (1861) and *History of Ireland from the Treaty of Limerick* (1868). He died in Cork, March 28, 1875.

MITCHEL, ORMSBY MCKNIGHT, an American soldier and astronomer; born in Morganfield, Kentucky, July 28, 1809. He graduated at West Point in 1829, in the same class with Robert E. Lee and Joseph E. Johnston. He was assigned to the artillery, and until 1832 was assistant professor of mathematics in the United States Military Academy. He resigned from the army and became professor of mathematics, philosophy and astronomy in Cincinnati College in 1836. In 1844 he succeeded in procuring the erection of an observatory in Cincinnati, of which he was made first director. During his incumbency of this office, which extended over many years, he made many notable astronomical discoveries, and in 1859 he took charge of the Dudley University, in Albany, New York. He discovered that Antares is a double star and made many observations of nebulae. It is said that during the years 1854-59 he conducted over fifty thousand distinct observations. He became brigadier-general of volunteers in 1861, and served in the army of the Ohio, in Tennessee and northern Alabama. He was promoted major-general of Volunteers, April 11, 1862, and later held command of the department of the South. He published *The Planetary and Stellar Worlds* (1848); *The Orbs of Heaven* (1851); *A Concise Elementary Treatise of the Sun Planets, Satellites and Comets* (1860); and *The Astronomy of the Bible* (1863). He died of yellow fever, in Beaufort, South Carolina, Oct. 30, 1862.

MITCHELL, a post village of Lawrence County,

central southern Indiana, 62 miles N.W. of New Albany, on the Baltimore and Ohio Southwestern and the Louisville, New Albany and Chicago railroads. It has saw and stave mills, lime-kilns, stone-quarries and a cigar factory. It is the seat of the Southern Indiana Normal College. Population 1890, 1,583.

MITCHELL, a city, railroad junction and the capital of Davison County, southeastern South Dakota, 42 miles W. of Sioux Falls, on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads. It has manufactories of chemicals and well-boring machinery, a creamery, a planing-mill, a broom factory and a brickyard, and ships much grain and live-stock. It is the seat of South Dakota (Methodist) University, a co-educational school, founded in 1885, which in 1896 had 14 instructors, 200 students, and a library of 4,000 volumes. The Chicago, Milwaukee and St. Paul railroad has repair-shops here. Population 1880, 320; 1890, 2,217.

MITCHELL, DONALD GRANT, an American author, better known as "Ik Marvel"; born in Norwich, Connecticut, April 12, 1822; graduated at Yale College in 1841; spent several years abroad, wandering over England on foot and afterward visiting the Continent; studied law in New York City and soon took to authorship, publishing a record of foreign travel under the title of *Fresh Gleanings, etc.* (1847). This was quickly followed by *The Battle Summer, etc.* (1849), containing personal reminiscences of the Continental revolution of 1848; *The Lorgnette* (1850); *Reveries of a Bachelor* (1850); *Dream-Life* (1851); and *Fudge Doings* (1854). He was appointed consul at Venice in 1853, and in 1855 retired to a farm near New Haven, known through *My Farm at Edgewood* (1863), and kindred publications. His later works include *About Old Story-Tellers* (1876); *Out-of-Town Places* (1884); and *English Lands, Letters and Kings* (1889-90). He was one of the judges of industrial art at the Centennial Exhibition of 1876, having acquired a reputation as a gentleman farmer and landscape-gardener, and formed one of the United States commission at the Paris Exposition of 1878. Few American writers have attained greater popularity than rewarded the author of *Reveries of a Bachelor* and *Dream-Life*, in which a pensive fantasy, blended with genial perceptions of life and unaffected pathos, is expressed in chaste, tranquil English prose. The theme is not profound; yet its notes are sweet and musical, and vibrate long in the affectionate memory of the listener.

MITCHELL, HINCKLEY GILBERT, an American clergyman and educator; born in Lee, Oneida County, New York, Feb. 22, 1846. He was educated at Wesleyan University School of Theology,



DONALD G. MITCHELL.

in Boston, and in Leipsic, Germany. He was in the Methodist ministry for two years and then entered Wesleyan University as professor of Latin, and in 1884 became professor of Hebrew and Old Testament in Boston University. He published *Hebrew Lessons* (1884); *Amos: An Essay on Exegesis* (1893); and *Theology of the Old Testament* (1893).

MITCHELL, MARGARET JULIA (MAGGIE), an American actress, was born in New York City, about 1832, and made her first appearance, when a child, on the stage of the old Bowery Theater. She became prominent as a soubrette during 1852, and afterward acquired a national reputation as an actress in *Fanchon*, of which she was the original. She also played with success in *Little Barefoot*, *The Pearl of Savoy*, and other dramas adapted to the requirements of her particular school.

MITCHELL, MARIA, an American mathematician and astronomer; born at Nantucket, Massachusetts, Aug. 1, 1818. At an early age she became an active assistant of her father, who was himself a teacher and an astronomer of some note. She carried on a series of independent observations, and in 1847 discovered a comet of small magnitude, the first of seven earliest detected by her, for which she received a prize gold medal from the king of Denmark, and a copper medal struck



MARIA MITCHELL.

by the republic of San Marino. She calculated the elements of this comet, and communicated the result to the Smithsonian Institution; was subsequently employed on the Coast Survey, and in the compilation of the *American Nautical Almanac*; visited the principal observatories of Great Britain and the continent of Europe in 1857, being the guest of Sir John Herschel and Sir George B. Airy, and visiting Leverrier in Paris and Humboldt in Berlin, her return to America being signalized by the presentation of a fine telescope by her countrywomen. In 1865 was appointed professor of astronomy in Vassar College, Poughkeepsie, New York, a position she retained until 1888. She was honored with the degree of LL.D. by Hanover in 1852 and by Columbia in 1887, and was chosen a member of the American Association for the Advancement of Science and the American Academy of Arts and Sciences, an unprecedented distinction among women. "I was not born with much genius," said she, "but with great persistency." She died at Lynn, Massachusetts, June 28, 1889.

MITCHELL, SILAS WEIR, an American neurologist; born in Philadelphia, Pennsylvania, Feb. 15, 1829. He was educated at the University of Pennsylvania and the Jefferson Medical College, and during the war had charge of the wards for diseases and injuries of the nervous system in the military hospitals of Philadelphia; after the war, practiced in Philadelphia, giving his attention to nervous diseases; was made a member of numerous scientific societies,

including the National Academy of Sciences and the British Medical Association; was for some time president of the College of Physicians; and has written a great deal, including, besides scientific works, both fiction and poetry. Some of his publications are *Wear and Tear; or, Hints to the Overworked* (1871); *Fat and Blood, and How to Make Them* (1877); *A Hill of Stones, and Other Poems* (1882); *In War Times*, a novel (1884); *Doctor and Patient* (1887); and *Far in the Forest* (1889).—His father, JOHN KEARSLEY, a physician; born at Shepherdstown, Virginia, May 12, 1798. He was educated in Scotland and studied medicine at the University of Pennsylvania; took several trips to China and the East Indies as a ship's surgeon; took up practice in Philadelphia in 1822; was successively lecturer and professor of chemistry at the Medical Institute; was professor of chemistry at Franklin Institute from 1833 to 1841, when he was chosen professor of the practice and theory of medicine at Jefferson College. Wrote *On the Wisdom, Goodness and Power of God as Illustrated in the Properties of Water* (1834); *On the Cryptogamous Origin of Malarious and Epidemic Fevers* (1849); *Five Essays on Various Chemical and Medical Subjects* (1858), besides several poems. He died in Philadelphia, April 4, 1858.

MITCHILL, SAMUEL LATHAM, a scientist of universal attainments; born in North Hempstead, Long Island, Aug. 20, 1764. Studied medicine in Hempstead and graduated at the University of Edinburgh; on his return, studied law; in 1790 he was elected to the New York legislature, and in 1792 became professor of chemistry and natural philosophy at Columbia College, New York City. In 1794 he made a mineralogical survey of the state of New York, and in 1797 was one of the founders of the *Medical Repository*, which he edited for sixteen years. In 1798, in the face of strong opposition, he advocated granting to Robert R. Livingston and Robert Fulton exclusive steam-navigation rights, and was one of the party making the first trip in the *Clermont* in 1807. In 1801 he retired from his college professorship, and from Dec. 1, 1801, until Nov. 22, 1804, served as a Democrat in Congress. Thereafter he was appointed to fill a vacancy in the United States Senate, and held that place until March 3, 1809. From 1820 to 1826 he was professor of botany and *materia medica* in the New York College of Physicians and Surgeons; became connected with various learned societies, corresponded with Joseph Priestley, and for his researches on fishes won the approbation of Cuvier. He made numerous contributions to scientific periodicals, including *The London Philosophical Magazine*; *The New York Medical Repository*; and *The American Mineralogical Journal*. He died in New York City, Sept. 7, 1831.

MITFORD, WILLIAM, an English historian, born in London, Feb. 10, 1744. He entered Queen's College, Oxford, but left without a degree. In 1761 he succeeded to the family estate of Exbury, near the New Forest, and in 1769 became a captain in the South Hampshire militia, of which Gibbon was then major. By Gibbon's advice and encouragement he was induced to undertake his *History of Greece*,—a

work reasonably supplanted by those of Thirlwall and Grote. He sat in Parliament from 1783 to 1818. He died at Exbury, Feb. 8, 1827.

MITO, LORD, also the name of a town. See JAPAN, Vol. XIII, p. 587.

MITOSIS, or KARYOKINESIS. See PROTOZOA, Vol. XIX, p. 833.

MITRAILLEUR. See GUNMAKING, Vol. XI, p. 285.

MITRE, BARTOLOME, a South American journalist, historian, and political and military leader. He was born in Buenos Ayres, June 26, 1821. After the election of 1874 he formed a revolutionary party which was defeated; the next year he accepted the offered amnesty, and from that time till his death, in January, 1894, spent his time in journalism. See also ARGENTINE REPUBLIC, Vol. II, p. 492.

MIVART, ST. GEORGE, an English naturalist; was born Nov. 30, 1827, in London; educated at



ST. GEORGE MIVART.

Clapham and Harrow schools, and at King's College, London; at 17 adhered to the Roman Catholic faith and finished his academic courses at St. Mary's College, Oscott. Called to the bar in 1851, he turned from the profession to medical studies; took medical degree at St. Mary's Hospital (1862), and 14 years later at Louvain; professor of biology in University College, Kensington (1874); professor of philosophy of natural history, Louvain (1890); member and officer of several learned societies devoted to botany and zoology; fellow of the Royal Society (1867).

Mr. Mivart wrote much to establish a concord between the faith of his church and biological science. Taking the position that intelligence raised man above the usual operation of development and selection, he has been called an opponent of Darwinism, but it is his tendency rather to restrict evolution to lower types than man. His position aroused both applause and criticism.

To this ENCYCLOPÆDIA he contributed the articles on APE; REPTILES; SKELETON; and VIPER. Among his many published treatises, the more important and characteristic are *Genesis of Species* (1871); *Elementary Anatomy* (1872); *Man and Apes* (1873); *Contemporary Evolution* (1876); *The Cat*, a study of vertebrates, especially mammals (1881); *Nature and Thought* (1883); *Origin of Human Reason* (1889); *Types of Animal Life* (1893); and *Introduction to the Elements of Science* (1894).

MNEVIS. See *Religion*, under EGYPT, Vol. VII, p. 716.

MOA. See DINORNIS, Vol. VII, pp. 243, 244.

MOABITES. See MOAB, Vol. XVI, pp. 533-536.

MOABITE STONE or MESHA STELE. See INSCRIPTIONS, Vol. XIII, p. 116; and SEMITIC LANGUAGES, Vol. XXI, p. 645.

MOAWIYA. See *The Omayyads*, under MOHAMMEDANISM, Vol. XVI, pp. 565-577.

MOBERLY, a city of Randolph County, north-central Missouri, 63 miles W.S.W. of Hannibal, on the Wabash and the Missouri, Kansas and Texas railroads. The Wabash railroad has machine-shops and division headquarters here. Flour, lumber, agricultural tools and ice are manufactured, and there are foundries, machine-shops and vitrified pressed-brick works. Coal is abundant in the vicinity. Farm produce, live-stock, wool, hides and hardwood lumber are shipped extensively. Population 1890, 8,215.

MOBERLY, GEORGE, an English author and educator; born in St. Petersburg, Russia, of English parentage, about 1803. He was educated at Oxford, was head master of Winchester School from 1835 to 1866, and in 1869 became bishop of Salisbury. His writings were mostly theological, and included *Introduction to Logic* (1838) and *The Law of the Love of God* (1864). He died July 6, 1885.

MOBILE, a city of Alabama. In 1870 the area of the city was reduced and the name changed to Port of Mobile, but municipal rights were restored in 1887. Commercially, the city has grown very little during the past decade, though as a fish and oyster market, as well as a fruit market, it is excellent. Two lines of steamers ply between Liverpool and New York and Mobile. The value of its annual exports remains about \$3,500,000; of its imports, \$560,000. It is more active than formerly in manufacturing. The aggregate capital of its manufactures is \$2,300,000; their annual product is valued at \$4,000,000. The most extensive industry is lumber-manufacturing. Tobacco products are next; flour and grist mill and foundry and machine-shop products follow. With the removal of the comparatively slight obstruction in the mouth of Mobile Bay, the city of Mobile will possess superior commercial advantages. Ships drawing 23 feet can enter and find safe and capacious anchorage in the lower bay, while vessels drawing 17 feet can now enter, the channel to the city. The city obtains a water-supply from two springs and from artesian wells, and is lighted with gas and electricity. To the west and south of the city are the pine groves, among which there are many fine residences, and which form a pleasant retreat from the summer heat. Near by is an African village, settled by negroes who came over in the last slaveship in 1859. Population 1890, 31,076. See also MOBILE, Vol. XVI, pp. 539, 540.

MOBILE RIVER, formed by the confluence of the Tombigbee and Alabama rivers, 50 miles above Mobile, and discharging itself into Mobile Bay at the city. The river divides into two branches, the east of which is sometimes called the Apalachee or Tensas River. It is navigable.

MOCCASIN or WATER-MOCCASIN. See SNAKE, Vol. XXII, p. 199.

MOCCASIN-FLOWER, a name sometimes applied to species of *Cypripedium*, a genus of orchids. They are more commonly known as "lady-slippers," and are among the most beautiful and curious

of our wild flowers. They abound in moist or swampy places, and especially in northern bogs. The slipper-like sac, formed by one of the petals, is the most conspicuous feature. The commoner forms have yellow flowers, but the most showy (*C. spectabile* and *C. acaule*) have flowers white and spotted with purple, or entirely rose-purple.

MOCHA-STONE. See AGATE, Vol. I, p. 278.

MODE, in music. For the Greek, see MUSIC, Vol. XVII, p. 79; for ecclesiastical, see MUSIC, Vol. XVII, pp. 80, 81.

MODESTO, a town and the capital of Stanislaus County, central California, 76 miles E. of San Francisco, on the Tuolumne River, and on the Southern Pacific railroad. It is in a fruit and wool-growing region, and also ships much wheat. It has planing and flour mills, a foundry and a farm-tool factory. Population 1890, 2,402.

MODJESKA, HELENA, a Polish-American actress; born in Cracow, Poland, Oct. 12, 1844; early mani-



HELENA MODJESKA.

fested an aptitude for the stage, but did not adopt it, owing to family opposition. When 17 years of age she married a government official named Modrzejewska and retained the name, as modified in its spelling, when she at length decided to go upon the stage, which she did by joining a company of strolling players. She continued to play in a rather desultory way for several years. Her husband died in 1865, and in 1868 she was married to Charles Chlapowski, the Count Bozenta, a Polish patriot and journalist, under whose influence, added to her own talents, she became the favorite theatrical star of Warsaw, which position she retained until 1876, when she accompanied her husband to America with the intention of founding a Polish colony in California. Though they secured a large ranch, the colonization did not succeed, and, ranch-life being lonely, she began to long for the glare and inspiration of the footlights again, with the result that in 1877 she appeared at a California theater as Adrienne Lecouvreur, and was successful at once. Afterward she made a tour of the United States, acting in that and other plays, and established her reputation at once. She afterward made a trip to Poland, but returned to America, with no desire to live permanently at her old home. Her greatest successes in the United States have been in *Adrienne Lecouvreur*; as Beatrice in *Much Ado About Nothing*; Rosalind in *As You Like It*; Marguerite Gautier in *La Dame aux Camélias*; and Mary Stuart in Schiller's play of that name. Because of an eloquent address in behalf of oppressed Poland, delivered during the Columbian Exposition, Mme. Modjeska was officially forbidden to enter Russian territory.

MODOCS, a small tribe of Indians formerly living in northern California, and known chiefly through the atrocities they perpetrated under the leadership of Captain Jack during the Modoc war of 1872 and

1873, when they murdered General Canby and Dr. Thomas, members of a peace commission sent out to treat with them. They had carried on a desultory war with settlers and the troops for many years. Finally it was decided to quell their rebellious instincts and practices, and they were sent to the Quapaw reservation, in the Indian Territory, after Captain Jack and others of the leaders of the rebellion had been hanged.

MODULE. See ARCHITECTURE, Vol. II, p. 467.

MODULUS OF ELASTICITY. See ELASTICITY, Vol. VII, pp. 804, 805.

MOEN, an island. See ZEALAND, Vol. XXIV, p. 771, note.

MOERIS, LAKE. See EGYPT, Vol. VII, p. 709.

MOGDISHU. See MAGADOXO, in these Supplements.

MOGUL. See INDIA, Vol. XII, pp. 793 et seq.; and XVI, p. 544.

MOHAVE DESERT, a basin, with little water or vegetation, chiefly in San Bernardino County, in the southeast of California, and extending into Arizona. This tract is fruitful wherever it can be watered. Irrigation-works are now a feature in the western part of San Bernardino County. The Mohave River rises in the San Bernardino Range, and finally disappears in the Mohave Sink.

MOHAVE INDIANS, the largest branch of the Yuman tribe. They are under the Colorado River agency in California, and number about two thousand. They live in commodious houses, and are among the finest specimens of Indians in North America; originally they came from Arizona. Their tribe, as far as known, has some fourteen divisions.

MOHAWK RIVER, a beautiful stream of New York, rising in Lewis County. It flows south to Rome, where it turns E.S.E., and flows past Utica and Schenectady and enters the Hudson a few miles above Troy. Its length is about 135 miles. After reaching Rome, it is followed through its entire course by the Erie canal.

MOHAWKS. See NEW YORK, Vol. XVII, p. 454.

MOHEGAN INDIANS. See INDIANS, Vol. XII, p. 831.

MOHL, HUGO VON, a German botanist; born at Stuttgart, in 1805. He studied medicine at the University of Tübingen, and in 1835 was made professor of botany there. He was, in his time, the highest authority on vegetable anatomy and physiology. He died at Tübingen in 1872. See also PROTOPLASM, Vol. XIX, p. 828.

MOHN, HENRIK, a Scandinavian meteorologist; born at Bergen, Norway, May 15, 1835. He was educated at the University of Christiania, and rose to be professor there and director of the Meteorological Institute in 1866; was a member of the meteorological congresses at Rome, Vienna and Munich; organized the Norwegian polar station at Bossekup; and has published *Atlas des Tempêtes de l'Institut Météorologique de Norvège* (1870); *Reports of the Norwegian North Atlantic Expedition* (1882-87); and *Grundzüge der Meteorologie* (1875).

MOIRE. See CALENDER, Vol. IV, p. 683.

MOISTURE. See ATMOSPHERE, Vol. III, p. 32, 33.

MOJOS OR **MOXOS**, a Bolivian race of Indians. They number several thousands, are exceptionally industrious, and rather a light-colored, handsome people. They live principally by agriculture, and are devout adherents to Catholicism, having been converted to that religion in 1674 by the Jesuits, who established 15 mission villages, one of which, Trinidad, is now the capital of the department of Beni.

MOKANNA OR **HAKIM-BEN-ALLAH**. See **MOKANNA**, Vol. XVI, p. 608.

MOLBECH, **CHRISTIAN** (1783-1859), a Danish lexicographer. See **SCANDINAVIAN LANGUAGES**, Vol. XXI, pp. 373, 374.

MOLDAU; a river. See **AUSTRIA**, Vol. III, pp. 116, 117.

MOLDAVIA. See **ROUMANIA**, Vol. XXI, p. 21.

MOLDING OR **MOULDING**. See **ARCHITECTURE**, Vol. II, pp. 467, 468; and **BUILDING**, Vol. IV, pp. 473, 487, 488, 506. A process, see **FOUNDING**, Vol. IX, pp. 479-481; and **POTTERY** AND **PORCELAIN**, Vol. XIX, p. 638.

MOLDS. See *Mucorini*, under **FUNGUS**, Vol. IX, pp. 830, 831.

MOLE, **LOUIS MATHIEU** (1781-1855), a French statesman. See **FRANCE**, Vol. IX, pp. 620, 621.

MOLE-CRICKET. See **CRICKET**, Vol. VI, p. 578.

MOLESCHOTT, **JAKOB**, a Dutch physiologist; born at Bois-le-Duc, April 9, 1822. He studied medicine at Heidelberg, and there taught physiology, anatomy and anthropology from 1847 until 1854, when he resigned his chair, the senate of the university having "warned" him on account of the strong materialistic tendency of his writings. In 1853 he established a private laboratory and worked in it until 1856, when he was nominated professor of physiology at Zurich; in 1861 he moved to the University of Turin, and in 1878 to that of Rome. He wrote several works of importance, including *Physiologie des Stoffwechsels in Pflanzen und Thieren* (1851); *Der Kreislauf des Lebens* (1852); *Lehre vom Leben* (1867). He was co-editor of several scientific journals. He died May 20, 1893.

MOLESWORTH, **GUILFORD LINDSAY**, a British civil and mechanical engineer; born at Millbrook, Hampshire, England, in 1828. He was educated at King's School, Canterbury, and at the College of Civil Engineers, Putney; served his apprenticeship on the London and Northwestern railway, and in connection with iron-works in South Wales; superintended the construction of the Royal Arsenal at Woolwich during the Crimean War; was for a number of years consulting-engineer in London; went to Ceylon in 1859, and in a short time rose to the position of consulting-engineer to the government of India, after having been director-general of railways in Ceylon. He published some important works, including *Pocket-book of Engineering Formula*, which is considered a standard work in the profession; *Proposals for the Establishment of Decimal Coinage in Ceylon* (1868); *Light Railways in Ceylon* (1870); *Graphic Diagrams* (1877); *Masonry Dams* (1883); *Imperialism for India* (1885); *Land as Property*; *Silver and*

Gold (1891); and *Instinct and Reason in Ants* (1886).

MOLESWORTH, **MRS. MARY LOUISA STEWART**, a novelist and popular writer for the young. She was born, of Scotch parentage, at Rotterdam, and her childhood was passed in Manchester, Scotland and Switzerland. She began to write when very young, and her first attempts were published when she was only 16. Her first complete works were written under the pseudonym "Eunnis Graham," when she was about 24. When she was about 30 she began to write for children, and was at once successful, and has since held foremost rank in this department. She contributed largely, also, to the better class of juvenile magazines. She wrote *Not Without Thorns*; *Cicily*; *Hathercourt Rectory*; *That Girl in Black*; and contributed children's stories to *The Child's Pictorial*, some of which afterward were published under the titles *Twelve Tiny Tales*; *The Abbey by the Sea*; and *The Little Old Portrait*. Later stories appeared under the titles *Mother Bunch*; *An Enchanted Garden* (1892); *Hollow Tree House*, and *Other Stories* (1894).

MOLINE, a city of Illinois. Population 1890, 11,995. See also **MOLINE**, Vol. XVI, p. 631.

MOLOKAI. See **HAWAIIAN ISLANDS**, Vol. XI, pp. 529, 532.

MOLTING. See *Moult*, under **BIRDS**, Vol. III, pp. 775, 776.

MOLTKE, **HELLMUTH KARL BERNHARD**, **COUNT VON**, a famous soldier, chief marshal of the German Empire, chief of the general staff, descended from a well-known Mecklenburg family; born at Parchim, Mecklenburg-Schwerin, Oct. 26, 1800. In his twelfth year he went to Copenhagen, in order to devote himself, in the barracks there, to the military profession; in 1822 entered the Prussian service, and studied in the Military Academy; in 1835 traveled in Turkey, and came under the notice of the Sultan Mahmoud, who consulted with the young Prussian officer respecting the reorganization of the Turkish army. Moltke remained several years in Turkey, and in 1839 took part in the campaign of the Turks in Syria against the Viceroy Mehemet Ali of Egypt and his adopted son, Ibrahim Pasha. In 1845, having returned to Prussia, and published an account of his Turkish experiences, he became adjutant to Prince Henry of Prussia, then resident in Rome, after whose death in 1847 he was engaged in connection with the general command on the Rhine, becoming, in 1848, a member of the grand general staff, and in 1849, chief of staff of the Fourth Army Corps, in Magdeburg. In 1858 he was advanced to the rank of chief of the grand general staff of the Prussian army, and in 1859 became a lieutenant-general. In the Austro-Italian war, Moltke was present in the Austrian headquarters. After the conclusion of



COUNT VON MOLTKE.

peace he spared no pains that he might fully develop the capacities of the Prussian general staff and the Prussian army. When the war of 1864 against Denmark broke out, Moltke sketched the plan of the campaign and assisted in its execution, acting similarly in the case of the Austro-Prussian war of 1866. The whole plan of the Bohemian campaign was due to the lieutenant-general, who was personally present at the battle of Königgrätz, which he directed, and in like manner arranged the advance of the Prussian columns against Olmütz and Vienna, and negotiated the armistice and the preliminaries of peace. For these services he received the order of the Black Eagle, and a national donation. To "Father Moltke" (Vater Moltke), as he was familiarly termed in the German army, and his brilliant strategy, are ascribed to a great extent the splendid victories of the German arms in the Franco-German war. He was practically the commander-in-chief, and the whole plan of the campaign was due to him. In recognition of his unrivaled services, Moltke was made the chief marshal of the German Empire in September, 1871, again received a national donation, and was created count in 1872. The illustrious marshal, who was generally regarded as the first strategist of the day, received from the Czar the order of St. George, the highest military decoration of Russia, in October, 1870; and from his own sovereign the grand cross of the order of the Iron Cross, March 22, 1871. He was placed on the retired list in 1888, and made president of national defense. He died April 24, 1891.

MOLYBDENITE. See MINERALOGY, Vol. XVI, p. 394.

MOMENT. See MECHANICS, Vol. XV, p. 683.

MOMMSEN, CHRISTIAN MATTHIAS THEODORE, a German historian; born at Garding, in Schleswig, Nov. 30, 1817. He studied at Kiel, next spent three years in traversing France and Italy, in the study of Roman inscriptions, under commission of the Berlin Academy, and in the autumn of 1848 was appointed to a chair of jurisprudence at Leipsic, of which, two years later, he was deprived, for the part he took in politics. In 1852 he was appointed to the chair of Roman law at Zurich, in 1854 at Breslau, and in 1858 to that of ancient history at Berlin. Here he was engaged for many years in editing the monumental *Corpus Inscriptionum Latinarum*, and in 1873 he was elected perpetual secretary of the academy. In 1882 he was tried for slandering Bismarck in an election speech, but was cleared, both in the lower court and in that of appeal. His greatest work is a *History of Rome*, a translation of which, by W. P. Dickson, appeared in 1863-67. *The Provinces of the Roman Empire from Caesar to Diocletian* (1886) supplements his history. Among his other works are *Römische Chronologie* (1859); *Römische Staatsrecht*; an edition of the digests, *Solinus*, *Jordanes* and *Monumentum Ancyranum*, and numerous other books and papers. Freeman characterizes Mommson as "the greatest scholar of our times, wellnigh the greatest scholar of all times; . . . language, law, mythology, customs, antiquities, coins, inscriptions, every source of knowledge of every kind, he is master of them all."—Of his brothers, two—TYCHO,

born at Garding, May 23, 1819, and AUGUST, born at Oldesloe, July 25, 1821—have achieved distinction, the former as a poet, and the latter as an authority on Greek and Roman chronology.

MOMOTIDÆ. See MOTMOT, Vol. XVII, p. 3.

MONAD. See LEIBNITZ, Vol. XIV, pp. 421-423.

MONAD ELEMENTS. See CHEMISTRY, Vol. V, p. 473.

MONADNOCK OR GRAND MONADNOCK, an isolated mountain in eastern Cheshire County, New Hampshire. It consists of a talc and slate formation, and is regarded as belonging to the White Mountain group. The diameter of its base is about five miles. Height, 3,718 feet.

MONARCHY. See GOVERNMENT, Vol. XI, pp. 10, 11 et seq.

MONCRIEFF, SIR ALEXANDER, a Scottish military engineer; born in 1829. He was educated at the Universities of Edinburgh and Aberdeen; served in Edinburgh for some time as a civil engineer; secured a commission in the Scotch Division, Royal Artillery, in which he afterward rose to the post of colonel commandant; traveled extensively in Europe, Asia, Africa and North America. In the Crimean War he was present at the siege of Sebastopol, and during the bombardments conceived the idea of a disappearing gun-carriage, which he developed afterward, securing its adoption by the British government. This invention led to all the modern systems of gun-carriages in coast-defense. Moncrieff for eight years was engaged in the Royal Arsenal. He was made a fellow of the Royal Society, a knight commander of the Bath (1890), and chairman of the Board of Management of Oxford Military Academy.

MOND, LUDWIG, a German chemist; born in Cassel, Germany, March 6, 1839; educated in the polytechnic school of his native town, at Marburg and at Heidelberg, where he studied under Bunsen; was a technical manager in some chemical works; went to Holland in 1863 to erect some Le Blanc soda-works; in 1862 went to England, in 1864 becoming settled at the works of Messrs. Hutchinson, in Widnes, where he perfected his process of recovering sulphur from alkali waste; in 1873 established alkali works near Norwich, in which the Solvay process was introduced, and afterward devoted much time to improving the process and perfecting machinery and implements used. He took out many patents in connection with this work, and developed many improvements in other branches of technical science, especially noteworthy being his process of making chlorine by the ammonia-soda process. He became vice-president of the Royal Institution; a fellow of the Royal Society; member of the council of University College; a life member of the British Association, and a member of numerous societies; published numerous papers and delivered many lectures on scientific subjects. He became, in 1881, managing director of the Limited Liability Company of Brunn, Mond and Company.

MONERA. See *Protozoa*, under ANIMAL KINGDOM, Vol. II, p. 50.

MONETARY STANDARDS, CONFLICT OF. See MONEY, Vol. XVI, pp. 735-738.

MONGOLIA. See ASIA, Vol. II, pp. 686, 687; and MONGOLS, Vol. XVI, p. 749.

MONGOOSE OR MUNGOOS. See ICHNEUMON, Vol. XII, p. 629.

MONIER-WILLIAMS, SIR MONIER, a British Sanskrit scholar and Indologist; born at Bombay, in 1819; was graduated B.A. from University College, Oxford, in 1844. He was professor of Sanskrit at Haileybury from 1844 till the abolition of that institution in 1858, when he removed to Cheltenham, and superintended the Oriental studies at the college for two years. In December, 1860, after a long contest, he was elected Boden Sanskrit professor at Oxford. He became a fellow of Balliol College, and in 1888 was appointed Duff lecturer in the University of Edinburgh. He made three trips to India, in 1875, 1876 and 1883, for the purpose of research into the condition of the religious sects, and to secure the co-operation of learned natives in establishing an Indian institute. He became a member of nearly all the Oriental societies of Europe and was honored by the conferment of many degrees. He wrote *An Easy Introduction to the Study of Hindustani* (1859); *Modern India and the Indians* (1878); *Indian Wisdom: Religious Thought and Life in India* (1883); *Brahmanism and Hinduism* (1887); and *Buddhism* (1889).

MONISM. See EVOLUTION, Vol. VIII, pp. 753, 769.

MONITOR, a vessel. See UNITED STATES Vol. XXIII, p. 778.

MONITORIDÆ. See LIZARD, Vol. XIV, p. 734.

MONITORS. See NAVY, in these Supplements.

MONKEY. See APE, Vol. II, pp. 151-155.

MONKSHOOD. See ACONITE, Vol. I, p. 98.

MONMOUTH, the capital of Warren County, Illinois. It is the seat of Monmouth College (United Presbyterian, founded 1856), which, in 1896, had 13 instructors, 352 students, and 18,000 volumes in its library. It manufactures agricultural implements, sewer-pipes, paving-brick, carriages, road-carts and cigars. Population 1890, 5,936. See also MONMOUTH, Vol. XVI, p. 755.

MONOCHORD. See PIANOFORTE, Vol. XIX, p. 65.

MONOCOTYLEDONS. See VEGETABLE KINGDOM, Vol. XXIV, p. 131.

MONODELPHIA. See MAMMALIA, Vol. XV, p. 372.

MONO LAKE. See CALIFORNIA, Vol. IV, p. 698; and UNITED STATES, Vol. XXIII, pp. 794-795.

MONOMANIA. See INSANITY, Vol. XIII, p. 104.

MONONGAHELA, a river which rises in Upshur County, West Virginia, and flows north to Pittsburg, where it unites with the Allegheny to form the Ohio. It is a very rapid stream, and affords water-power for numerous lumber-mills on its banks. Coal-mining villages are frequent

along its course. Length, over one hundred and fifty miles, of which about twenty are navigable for river-boats.

MONONGAHELA CITY, a post borough of Washington County, Pennsylvania, 32 miles above Pittsburg, on the Monongahela River, and on the Pennsylvania railroad. It contains a strawboard paper-mill, planing-mills, manila-paper mill and gas-works. There are coal-mines in the vicinity, and it is one of the most important wool-shipping cities in the state. Population 1890, 4,086.

MONOPHYSITES OR EUTYCHIANS. See EUTYCHES, Vol. VIII, p. 724; and JACOBITE CHURCH, Vol. XIII, p. 538.

MONOTREMATA. See MAMMALIA, Vol. XV, pp. 377, 378.

MONROE, a city and the capital of Ouachita Parish, central northern Louisiana, on the Ouachita River, and on the St. Louis, Iron Mountain and Southern and the Vicksburg, Shreveport and Pacific railroads. It has a cotton-compress, ice factory, cottonseed-oil mills, shingle and saw mills, sash, blind and door factories, brickyards, and a stove factory which ships its products direct to Bordeaux, France. Population 1890, 3,256.

MONROE, a city and the capital of Monroe County, southeastern Michigan, 35 miles S.S.W. of Detroit, on Raisin River, and on the Lake Shore and Michigan Southern and the Michigan Central railroads. Grain, grass and fruits are the principal products of the surrounding country. Monroe has extensive nurseries and tile factories, several paper-mills, sash and blind factories, flour-mills, foundries and polishing-material works. It ships large quantities of telegraph-poles. It has a city library, woman's seminary, conservatory of music, banks and several papers. Population 1890, 5,258; 1895, 5,613.

MONROE, a town and the capital of Union County, southwestern North Carolina, 26 miles S.E. of Charlotte, on the Sea-board Air-Line railroad, and on a branch of the Yadkin River. It manufactures carriages, iron-work, cotton, and other articles. Population 1890, 1,866.

MONROE, a city and the capital of Green County, central southern Wisconsin, 38 miles S.S.W. of Madison, on the Illinois Central and the Chicago, Milwaukee and St. Paul railroads. It is in a stock-raising and dairying region, and has a foundry, creamery, cheese factory, boiler, agricultural and wagon factories. Population 1890, 3,768; 1895, 3,843.

MONROE, FORT, a defensive work in the Department of the East, having a postal and telegraph station of the same name, and a railroad station, known as Old Point Comfort, on the Chesapeake and Ohio railroad. The fort is situated in Elizabeth City County, southeastern Virginia, on Hampton Roads, near the city of Hampton, and has daily communication by steamer with Baltimore, Washington, Norfolk and New York. It was built for the defense of Hampton Roads and Gosport navy-yard, the work on the fortifications having been begun in 1817, according to the de-

signs of General Simon Bernard, a foreign engineer of eminence. Fort Monroe is commonly and with propriety called a fortress, from the large area which it incloses, eighty acres, together with numerous detached buildings. In shape it is an irregular hexagon, two of whose sides, comprising the three channel fronts, have an armament arranged in two tiers, one in casemates, one *en barbette*; while on the other four sides the ramparts are solid, with the exception of casemates on some of the flanks. Surrounding the work there is a tidewater-ditch, eight feet deep at high water, and a scarp-wall rising to a height of 17 feet above high water. The construction of the fortifications cost the United States government \$2,818,000. During the Civil War it remained in the hands of the Federal government, and was of vast importance in the various military operations undertaken upon the southern Atlantic seaboard, and after the close of the war was for two years the prison of Jefferson Davis. It has undergone numerous alterations in recent years, that it may conform to the demands of modern warfare, and as now laid out it mounts 118 guns, 18 flanking-howitzers, and 51 guns *en barbette*. There are located here an artillery school and a garrison of eight companies of artillery. Fort Monroe and neighboring points in this region are popular winter resorts.

MONROE CITY, a town of Monroe County, northeastern Missouri, 23 miles W. of Hannibal, on the Hannibal and St. Joseph and the Missouri, Kansas and Texas railroads. It is in an agricultural region, and ships some railroad ties. It has flour, saw, planing and carding mills, and hay-rake and hay-stacker factories. Population 1880, 640; 1890, 1,830.

MONROE DOCTRINE. In September, 1815, when the allied powers of Europe were assembled at Paris after the second overthrow of Napoleon, Alexander, Emperor of Russia; Francis, Emperor of Austria, and Frederick William, King of Prussia, formed a league, which they called "The Holy Alliance," and signed a treaty, which is of interest to us to-day because it gave them the name of "Holy Allies," and because to it have wrongfully been attributed results which sprang from the quadruple treaty signed two months later by Russia, Prussia, Austria and Great Britain,—a new alliance which bound the four powers to do four things: exclude Napoleon forever from power; maintain the government they had just set up in France; resist with all their might any attack on the army of occupation; and meet in 1818 to consult concerning their common interests, and to take such measures as should then seem to be the best fitted to serve the peace and happiness of Europe. Each pledge was faithfully kept, and in the autumn of 1818 the four powers met at Aix-la-Chapelle and reviewed the events of the past three years. In Spain matters had gone from bad to worse. For ten years past her South American colonies had been in rebellion, first against Joseph Bonaparte and then against the Cortes of Cadiz, and since

the restoration of 1814 against the King. That Ferdinand, single-handed, could never reduce them to subjection was apparent; and at the conference at Aix-la-Chapelle, Russia brought the matter before the powers and asked that Wellington preside over a conference of ambassadors at Madrid, to decide what terms Spain should offer her colonies. Against this England stood out, and Spain was left to go on with the struggle in her own way.

Her way was to gather a rabble at Cadiz in the summer of 1819, call it an army and send it to America. But yellow fever broke out, and before the troops could be shipped, a conspiracy was hatched, a revolution was started, and on the 9th of March, 1820, Ferdinand was forced to re-establish the constitution of 1812 and swear to support it. As tidings of this outbreak spread over Europe, the friends of liberalism took heart, and in July, 1820, the people of Naples forced their king to proclaim the Spanish Constitution and swear to uphold it. The men of Portugal were next to awake, and in September, 1820, they deposed the regency which ruled in the name of the absent king, set up a Junta and elected a Cortes to frame a constitution. For a moment it seemed not unlikely that France might be the next nation to throw off the yoke of absolutism. But Louis cried out for another meeting of the powers, and in October, 1820, the Emperor of Austria met the Czar and the King of Prussia in the little town of Troppau, in Moravia, whence they sent forth the famous Troppau circular, and summoned the King of Naples to meet them in 1821, at Laybach. At the Laybach meeting the allies reviewed the state of affairs in Naples, and having decided to stamp out popular government, sent an Austrian army into Italy, and in 1821 re-established absolute monarchy.

When the congress at Laybach adjourned in 1821, it did so with the understanding that it should meet in 1822 and take up the affairs of Spain, which, both in the Old World and the New, were far beyond her control. The place of meeting was Vienna, but the congress soon adjourned to Verona, where, in October, 1822, the question of "restoring order," which meant "re-establishing absolute monarchy" in Spain, was long debated. At length it was decided that no joint action should be taken, but that certain changes in the Spanish constitution should be demanded, and if not granted, a French army should enter Spain. The demands were made and refused. The ambassadors of the Holy Allies then left Madrid, and on April 7, 1823, a French army crossed the frontier and occupied Madrid in May and Cadiz in August.

At that moment, Canning, then Prime Minister of Great Britain, turned to Richard Rush, who represented the United States at London, and proposed that the latter should join with England in a declaration, that, while neither power desired the colonies of Spain for herself, it was impossible to look with indifference on European intervention in their affairs, or to see them acquired by a

third power. Rush had no instructions, but promised to join in the declaration if England would first acknowledge the independence of the little republics. This she would not do, and the joint declaration was never made.

When Monroe received the letters of Rush, he seems to have been greatly puzzled how to act, so he turned to Jefferson for advice, and sent the letters of Rush to Monticello, and late in October received a reply:

"The question presented by the letters you have sent me is the most momentous which has ever been offered to my contemplation since that of independence. That made us a nation; this sets our compass, and points the course which we are to steer through the ocean of time opening on us. And never could we embark upon it under circumstances more auspicious. Our first and fundamental maxim should be, never to entangle ourselves in the broils of Europe; our second, never to suffer Europe to intermeddle with Cisatlantic affairs. America, North and South, has a set of interests distinct from those of Europe, and peculiarly her own. She should, therefore, have a system of her own, separate and apart from that of Europe."

Thus encouraged, not simply to meet an emergency, but to "point the course which we are to steer through the ocean of time opening on us," Monroe consulted his secretaries, and, with their approval, announced the new policy of his country, in his annual message to Congress on Dec. 2, 1823. As then set forth, it consisted of three distinct statements:

1. "The political system of the allied powers is essentially different in this respect from that of America. This difference proceeds from that which exists in their respective governments. And to the defense of our own, which has been achieved by the loss of so much blood and treasure, and matured by the wisdom of their most enlightened citizens, and under which we have enjoyed unexampled felicity, this whole nation is devoted. We owe it, therefore, to candor and to the amicable relations existing between the United States and those powers to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere. But with the governments who have declared their independence and maintained it, and whose independence we have, on great consideration and on just principles, acknowledged, we could not view any interposition for the purpose of oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States.

2. "Our policy in regard to Europe, which was adopted at an early stage of the wars which have so long agitated that quarter of the globe, nevertheless remains the same, which is, not to

interfere in the internal concerns of any of its powers; to consider the government *de facto* as the legitimate government for us; to cultivate friendly relations with it, and to preserve those relations by a frank, firm and manly policy; meeting, in all instances, the just claims of every power, submitting to injuries from none. But in regard to these continents, circumstances are eminently and conspicuously different. It is impossible that the allied powers should extend their political system to any portion of either continent without endangering our peace and happiness; nor can any one believe that our southern brethren, if left to themselves, would adopt it of their own accord. It is equally impossible, therefore, that we should behold such interposition, in any form, with indifference."

It happened that just at this time Russia had founded a colony in California, and had asserted her claim to the Pacific Coast as far south as lat. 51° N. This brought her in conflict with the United States, which then held the Oregon country in joint occupation with England. Against the action of Russia the United States protested, and held that as California belonged to Mexico, and as Mexico was an independent power, it was no longer open to European colonization. Monroe's words on this matter form the third part of his doctrine.

3. "The occasion has been deemed proper for asserting, as a principle in which the rights and interests of the United States are involved, that the American continents, by the free and independent condition which they have assumed and maintained, are henceforth not to be considered as subjects for future colonization by any European powers."

In plain language, the doctrine meant,—

1. The United States will "not interfere in the internal concerns" of any European power.

2. "But in regard to these continents [North and South America], circumstances are eminently and conspicuously different," and if any European power attempts at any future time to extend its political system to any part of this hemisphere "for the purpose of oppressing" the nations, or "*controlling in any other manner their destiny*," the United States will interfere.

3. No more colonization on the American continents by European powers.

J. B. McMASTER.

MONROEVILLE, a post village and railroad center of Huron County, central northern Ohio, 60 miles W. of Cleveland, on the Baltimore and Ohio, the Lake Shore and Michigan Southern and the Wheeling and Lake Erie railroads. It has grain-warehouses, wagon-shops, organ factory, bending-works, and manufactures flour, beer, agricultural tools, fanning-mills and woolen goods. Population 1890, 2,069.

MONROVIA. See LIBERIA, Vol. XIV, p. 508.

MONSON, a village of Hampden County, Massachusetts, 15 miles E. of Springfield, on the Chicopee River, and on the Central Vermont rail-

road. It has a large state school for children of pauper aliens, a savings bank, an academy, and a public library containing six thousand volumes. Granite of fine quality is quarried here, and straw and woolen goods are manufactured. Population 1890, 3,650; 1895, 3,746.

MONSOON. See METEOROLOGY, Vol. XVI, p. 148.

MONT OR MENTU, a god. See EGYPT, Vol. VII, p. 716.

MONTAGUE, a village of Muskegon County, central western Michigan, 15 miles N. of Muskegon, on White Lake, 5 miles E. of Lake Michigan, and on the Chicago and West Michigan railroad. It is a commercial town, and is especially noted as a shipping-point for peaches. Its lumber interests are also important, and it has regular steamboat connection with the principal ports on Lake Michigan. Population 1890, 1,623; 1895, 1,410.

MONTALEMBERT, MARC RENÉ, MARQUIS DE, a French military engineer, grandfather of the orator and statesman; born at Angoulême, July 16, 1714. He was the author of *La Fortification Perpendiculaire*, and the originator of the modern application of the casemate to forts and batteries. He was in the French army for several years, and subsequently engaged in the manufacture of cannon for the navy. He died March 29, 1800. See also FORTIFICATION, Vol. IX, pp. 442, 465.

MONTALVO, GARCIA ORDONEZ. See ROMANCE, Vol. XX, pp. 654, 655.

MONTANA had a population, in 1890, of 132,159, that of 1880 having been 39,159—a gain for the ten years of 93,000, or 237.49 per cent, which was the third largest of any state in the Union during the same period. The density of population was .91 to the square mile, a gain from .27 in 1880. Of the inhabitants, 24,557 resided in the two cities of the state, which constituted 18.58 per

cent of the entire population. In 1890 it was 146,080 square miles, of which 770 square miles are water surface and 145,310, or 92,998,400 acres, are land surface.

July 4, 1889, a constitutional convention met in Helena and adopted a state constitution, of which the following are the principal features:

1. There were to be three branches of the government,—legislative, executive and judicial.

2. The legislative authority was to be vested in a senate and house of representatives, the former to be elected for four years and the latter for two years. The sessions of the legislature were to be biennial, limited to sixty days after the first session, which was to be for ninety days. The usual powers to impeach and try state officers were granted, but the passage of local and special laws was not allowed, nor was the legislature to make appropriations for charitable, industrial, educational or benevolent purposes to any person, corporation or community not under the absolute control of the state, nor pass acts authorizing the state or any county to give financial aid toward the building of any railroad. In 1893 the senate consisted of 16 members and the house of 55.

3. The executive department was to consist of a governor, lieutenant-governor, secretary of state, attorney-general, state treasurer, state auditor and superintendent of public instruction, all of whom were to hold office for four years, with the exception of officers chosen at the first election, whose terms were to expire on the first Monday of January, 1893. The usual veto powers were given to the governor, and he was authorized to veto separate items of appropriation bills.

4. The supreme court was to consist of three judges, to be elected by the people for a term of six years, but the legislature was authorized to increase the number of judges to five when necessary so to do. The supreme court was to have appellate jurisdiction and a general supervisory control of the inferior courts.

5. Voters must be citizens of the United States, and resident one year in the state. Women were made eligible to vote at any school-district election, and, when tax-payers, were given the right to vote upon questions submitted to the vote of the tax-payers of the state, provided they possessed the qualifications required of men. Many radical innovations upon old usages were made, among which was the provision that in civil actions, and in criminal cases not amounting to felony, two thirds of the jury might render a verdict. Trusts, lotteries and contract labor in prisons were prohibited, and amendments to the constitution must receive a two-thirds vote of each house and a majority of the votes at the next popular election. Provision was made for taking a state census in 1895 and each tenth year thereafter. The state tax was limited to three mills until the taxable property of the state should reach \$100,000,000, when the rate should not exceed two mills and a half, and when the valuation should be \$300,000,000 the rate should not exceed one mill and a half.



STATE SEAL OF MONTANA.

cent of the entire population. In 1880 there were no cities in Montana of 8,000 or upward, the number prescribed by the census authorities as necessary to constitute a city. The relative number of males and females in 1890 was 87,882 of the former and 44,277 of the latter. This gave but 50,382 females to each 100,000 males, the lowest relative proportion of that of any of the states,—a position also held in 1880 and 1870. The percentage of native-born citizens was 67.39; of foreign-born, 32.61. The number of 'negroes' in 1890 was 1,490,—a gain of 1,154 from 1880.

Montana was admitted to the Union, Nov. 8, 1889, being the twenty-eighth state admitted and the forty-first in order. The area as given in

The state capital was fixed temporarily at Helena, the final location to be submitted to a vote of the people. At the general election in 1892 no city received a majority of all of the votes cast, and in accordance with the provision made for such an event, Helena and Anaconda, having received the largest number of votes, were submitted to the people at the next general election, and Helena was selected as the permanent capital.

The great source of wealth to the citizens of Montana is in her rich mineral deposits. Gold has been found in all parts of the state, silver in fully three fourths, copper and lead are abundant, and fully 60,000 square miles are underlaid with the best quality of bituminous and lignite coals. The production of gold for 1894 amounted to \$3,651,410, and the total production from 1862 aggregated \$193,941,478. The silver-production for 1894 reached \$16,575,458,—more than \$5,000,000 less than the output of 1893. The total product from 1876 was \$207,998,425. In the production of copper Montana has long led the other states of the Union, producing almost 40 per cent of the entire product, the most of this coming from the locality of the city of Butte. The output for 1894 was \$17,375,692,—more than 186,000,000 pounds. The lead-production for the same year aggregated 25,566,188 pounds. The products of the gold, silver, copper and lead mines for the year mentioned amounted to within a few dollars of \$40,000,000. Conservative estimates of the total production of the metals named from the beginning of operations places the value at \$320,000,000. Iron ore of excellent quality exists in inexhaustible quantities, but has not yet been developed to any considerable extent. The fuel for reducing to the pig is abundant, the coal and coke produced in 1894 reaching the value of \$1,700,000, and the total amount produced since 1883 aggregated \$9,133,392. Garnets, carbuncles, sapphires and rubies are among the precious stones found in the gravel deposits of the state, and experts have pronounced the discovery of the sapphire and ruby mines of Montana the most important gem-find of modern times.

Roundly estimated, one third of the area of Montana may be classed as arable, susceptible of cultivation if irrigated, one third as grazing-lands, and one third as forest or mineral lands, the gold, silver and copper veins being generally in the timbered country. This estimate would give 30,000,000 acres of lands available for cultivation if irrigated, while the assessors' returns for 1893 show that only 1,500,495 acres were fenced, that only 395,290 acres were cultivated, and that of this 253,374 acres were hay-lands, leaving only 131,916 acres in grain, vegetables, etc. So far, farming has been confined almost wholly to the lands along the streams, first bottom lands being cheaply irrigated by simply diverting the water from the streams adjacent. The general staple products of Montana are about the same varieties as those of many of the states of the Union, and of France, Germany, Austria and Russia; namely, wheat, oats, barley, rye, potatoes,

and other root crops. The quality and yield, however, are rarely excelled in the world. Ten awards were received at the World's Fair,—two on wheat, two on barley, one on oats, two on timothy and one on blue-joint. The following will show the average yield of the principal crops of Montana, and a comparison with the average for the United States, where such averages are known:

	MONTANA.	UNITED STATES.
Wheat ----- number bushels per acre	25.91	13.4
Oats ----- number bushels per acre	38.84	24.4
Barley ----- number bushels per acre	34.14	19.4
Rye ----- number bushels per acre	29.16	13.0
Potatoes ----- number bushels per acre	160.48	70.3
Cabbages ----- number lbs. per acre	8,576	-----
Rutabagas ----- number lbs. per acre	10,191	-----
Turnips ----- number lbs. per acre	7,702	-----
Onions ----- number lbs. per acre	7,282	-----
Hay ----- number tons per acre	1.31	1.32

In 1894 the following returns were made by the assessors: Horses, 184,633; milch cows, 28,473; stock cattle, 642,427; sheep, 2,228,875; and hogs, 12,596. In 1889, as shown by the eleventh decennial census, there were 5,603 farms in Montana, as against 1,519 in 1879, and 851 in 1869. The total value of the farm lands, fences, buildings, farm machinery and implements and live-stock was, in 1890, \$48,489,037, as compared with \$8,787,243 in 1880 and \$2,693,324 in 1870.

It is estimated that the area available for grazing, covered with nutritious grasses, and not having water available for agricultural purposes, will reach 40,000 square miles. Cattle-raising has long been one of the leading and most profitable of the agricultural industries, as cattle range the year around, requiring little care until fitted for shipment. In 1895, 215,534 Montana cattle were shipped to Chicago alone, and the total net value of all marketed was \$10,600,000. The wool-clip of 1894 reached 6,527,469 pounds, and that of 1895 was considerably heavier, the receipts for both wool and mutton for the year aggregating more than \$2,000,000.

The total assessed valuation of Montana, after equalization, in 1804, amounted to \$118,850,892,—a decrease of over \$9,000,000 from the assessment of 1893, and more than \$23,000,000 from that of 1891. This was due to the depreciation in values, principally of real estate, which in 1894 was placed at \$61,610,636, and the personal property at \$47,177,799. The mines of the state are not taxed as property, but the net proceeds are subject to taxation. The decreased operations in the silver-mines are also a contributing cause to the lowering of the assessed valuation. The census authorized by law to be taken in 1895 was completed on the date of March 31st, of that year, and the result showed the population to have been 182,490, or an increase of 50,331, almost forty per cent, for the five years. The state treasurer reported on Nov. 30, 1895, as follows: Balance on hand Dec. 1, 1894, \$219,597; received during the year, \$594,694; paid out during the year, \$541,256; balance on hand, \$273,034.

The counties of the state reported a total indebtedness in 1895 of \$2,856,053. The state proper had no debt at the time, and is prevented by constitutional enactment from incurring indebtedness in excess of \$100,000, except in case of war or to suppress insurrection. The counties are prohibited from becoming indebted to an amount exceeding five per cent of the taxable property therein.

At the beginning of 1895 there were 35 national banks and 14 private banks in the state, with an aggregate paid-up capital of \$7,077,000. There were also two savings banks, with resources of \$2,021,392, with individual interest bearing deposits of \$887,374, and deposits, subject to check, of \$528,955. The seven state banks had resources amounting to \$1,399,158, a capital stock paid in of \$425,000, and deposits subject to check amounting to \$527,242.

In 1894 the total number of railroads in Montana was 30; the miles of road within the state, 2,712; and the total assessed value, \$10,062,457. One or more of these different lines of road is in operation in every county of the state, except Fergus, and nearly all principal valleys, cities, towns and mining-camps were accessible by rail at the beginning of 1896.

In 1894 there were, in the state, 259 public schoolhouses, with 801 teachers and 25,270 pupils. In addition there were 32 private schools, with 839 pupils. The wages of male teachers averaged \$65.20 per month; those of females, \$46.95. The total expenditures for teachers' wages for the year was \$373,583. The value of the school houses and grounds was \$1,660,730. Other special educational institutions in a number of cities and towns include the State University, Agricultural College, School of Mines, and State Normal School, all of which are largely endowed, as are several others.

In 1894 there were 10 Congregational, 31 Presbyterian, 46 Methodist Episcopal, 17 Methodist Episcopal Church South, 31 Episcopal, 14 German Lutheran, 18 Baptist and 19 Christian churches, missions or organizations, with 9,872 members and 13,931 Sunday school scholars. There were 94 Roman Catholic churches, missions or organizations, with a membership of 29,309. There are a number of other religious organizations in the state, of which no statistics later than the census of 1890 are available, at which time the following figures were given. A comparison will show the growth of many of the denominations: There were 273 church organizations in the state, 164 edifices, a membership of 32,478, which constituted 24.57 per cent of the population, and church property of the value of \$885,950. The denominations represented numbered 16, the most prominent, in point of numbers, being the Baptists, all bodies, 14; Roman Catholics, 94; Disciples of Christ, 13; all Methodists, 74; all Presbyterians, 24; and Protestant Episcopal, 30.

The state institutions of Montana include the Eastern State Prison, located at Billings; the Western State Prison, located at Deer Lodge;

the State Insane Asylum, located at Warm Springs; the State Reform School, located at Miles City; the Home for Orphans, Foundlings and Destitute Children, located at Twin Bridges; the State School of Mines, located at Butte; the Deaf and Dumb Asylum, located at Boulder; and the State Normal School, located at Dillon.

The authorized strength of the National Guard of Montana is 585. The force in 1895 consisted of one regiment of infantry and a signal corps, the strength being 57 officers and 438 enlisted men. The state appropriation in 1894 was \$21,700. The government appropriation in 1895 was \$2,587.

In January, 1896, there were 100 newspapers published in the state of Montana. One or more papers were published in all of the 23 counties, in 45 of the cities, towns and villages, and in 22 county seats. Of the whole number of papers, 12 were daily, 1 triweekly, 1 semiweekly, 79 weekly, 2 semimonthly, and 5 monthly.

In 1895 there were free public libraries in the following towns and cities of Montana: Anaconda, Bozeman, Butte, Dillon, Great Falls, Helena and Missoula. School libraries contained about 8,000 volumes, distributed among some 15 places. Colleges and academies had libraries in the following places: Bozeman, Deer Lodge, Twin Bridges and Helena (2). In addition to the foregoing there are other small libraries and reading-rooms, to the number of 15 or 20.

The following are the principal cities and towns of Montana, with the population as given in the census of 1890: Helena, 13,834; Butte City, 10,723; Great Falls, 3,979; Anaconda, 3,975; Missoula, 3,416; Livingston, 2,850; Bozeman, 2,143; Walkerville, 1,743; Marysville, 1,489; and Deer Lodge, 1,463.

The following is a list of the governors of Montana, territorial and state, together with their respective terms of office: *Territorial*—Sidney Egerton, 1864–65; Thomas Francis Meagher (acting), 1865–66; Green Clay Smith, 1866–69; James M. Ashley, 1869–70; Benjamin F. Potts, 1870–82; J. Schuyler Crosby, 1882–84; B. Platt Carpenter, 1884–85; Samuel T. Houser, 1885–86; Preston H. Leslie, 1886–89. *State*—Joseph K. Toole, 1889–92; John E. Rickards, 1893–97; R. B. Smith, 1897. See also MONTANA, Vol. XVI, pp. 772–774.

MONTANA, UNIVERSITY OF, a state institution of learning, was formally opened Sept. 11, 1895. The University grounds comprise forty acres, on the south side of the Missoula River, near Missoula. The university building is a modern brick structure, containing three stories and a basement. The lecture-rooms are on the first floor, the laboratories and library on the second and the assembly-room on the third. There are six professors for the following departments: history and literature; natural science; mathematics; modern languages, combined temporarily with the department of applied science; music. The courses are: the classics, leading to the degree of A.B.; philosophy, leading to the degree of B.Ph.; science, leading to the degree of

B.S.; and applied science, to be developed into different courses, leading to degrees in the industrial arts. There is a preparatory department. The number of students matriculated the first year was 118. The various laboratories were fairly well equipped and the library started with 817 volumes.

MONTAUK POINT, a headland at the extreme eastern point of Long Island, New York. Has a lighthouse, with a brilliant white light 172 feet above the sea. The name is derived from a tribe of Indians now extinct. It is part of the township of East Hampton, Suffolk County, New York, lat. $41^{\circ} 4' N.$, long. $71^{\circ} 51' 54'' W.$

MONT BLANC. See **BLANC**, **MONT**, Vol. III, p. 807.

MONTCALM, **LOUIS JOSEPH DE SAINT-VÉRAN**, **MARQUIS DE**, a French soldier; born near Nîmes, France, Feb. 29, 1712. He was carefully educated, and at the age of 15 entered the French army as an ensign, serving in Italy, Bohemia and Germany, and in 1743 he was promoted colonel. In 1746, at Piacenza, he received five saber-cuts and was made prisoner. Later he was exchanged, promoted to brigadier-general and again wounded. In 1755 he was appointed to succeed General Dieskau in Canada as commander-in-chief of the French forces, and in 1756 sailed from Brest. In August of the same year, he captured Fort Ontario, at Oswego, and in the following year took Fort William Henry, with 2,500 men and 42 guns. In 1758 he occupied and strengthened Ticonderoga. On July 8th of that year, with an army of 3,500, he repulsed General Abercrombie's forces of 15,000 men. In 1759, General Wolfe, with about 8,500 troops, ascended the St. Lawrence River, accompanied by a large naval force, when Montcalm mustered his army on the Montmorency to oppose the English. Quebec, with the opposite shore of Beauport, was occupied by a motley crowd of French defenders, consisting of regulars, militia and Indians. Montcalm shared the command with Vaudreuil, and on the first attempt of the British general to scale the heights of Montmorency, Wolfe met with a disastrous repulse. On the morning of September 13th, Wolfe, with about 5,000 men, scaled the heights that border the St. Lawrence, gained the plateau of Quebec and formed for battle on the Plains of Abraham. Montcalm left his camp on the Beauport shore, crossed the river St. Charles, and at ten o'clock in the morning advanced to attack the enemy. The forces were about equal in number. Montcalm personally led the charge, but the French lines soon broke in disorder. Wolfe, leading the pursuit, was killed. Montcalm vainly tried to rally his forces, but was carried away by the tide of fugitives, and struck by a bullet which passed through his body. He died from his wound on the following day, thanking God that his hand would not have to sign the capitulation of Quebec. A monument in honor of the two heroes stands now in Quebec.

MONTCLAIR, a post village and a railroad center of Essex County, New Jersey, situated 5

miles N.N.W. of Newark and 14 miles from New York, situated on the Delaware, Lackawanna and Western and the New York and Greenwood Lake railroads. It is a very healthful place, and the township has been mostly built up by New York business men. It has three newspapers, six churches, a fine high-school, and a manufactory of pasteboard; also a state bank with a capital of \$50,000, a public library and a clubhouse. Population 1895, 3,150.

MONT-DE-PIÉTÉ, a state-governed institution for loaning money on pledges of the poor, common in modern Latin countries. See also **PARIS**, Vol. XVIII, p. 283; and **PAWNBROKING**, in these Supplements.

MONTE CARLO. See **MONACO**, Vol. XVI, p. 717.

MONTEFIORE, **SIR MOSES**, an English philanthropist; born at Leghorn, Italy, Oct. 24, 1784. When a child he accompanied his parents to London, where they settled, and where his career as a banker was both brilliant and successful. He was the first Hebrew to be elected sheriff of London (1837), was knighted the same year, and created a baronet in 1846. He retired from business in 1824, and devoted his whole time and a large portion of his wealth to works of benevolence among Jews and Gentiles. In 1827 and 1839 he visited Palestine with the view of establishing Jewish colonies; in 1846 he presented in person a petition to Czar Nicholas in behalf of his persecuted brethren. He was presented with the freedom of the city of London in 1873. From 1855 to 1875 he successively visited Syria, Italy, Constantinople, Morocco, Bucharest and Jerusalem, bent upon improving the condition of the Jews. In memory of his wife he founded, at Ramsgate, the Judith Montefiore College for the training of Jewish divines. His zeal and charity were honored by all the sovereigns and people of the civilized world. In his one hundredth year he was still hale and in full possession of his faculties, but died the following year, July 28, 1885, at Ramsgate.

MONTÉGUT, **ÉMILE**, a French writer; born at Limoges, France, June 24, 1826. His first publication was an article in the *Revue des Deux Mondes* for August, 1847, on the philosophy of Emerson, which was followed by a series of studies of English and American literature. In 1857 he succeeded Gustave Planche in the political reviewing department of the *Revue*, which position he filled until 1862, when he transferred his services to the *Moniteur Universel*. He translated into French the *Complete Works of Shakespeare* (10 vols., 1868-73) and Macaulay's *History of England*.

MONTEMAYOR, **JORGE**. See **PASTORAL**, Vol. XVIII, p. 346.

MONTÉREY, a post village and the capital of Monterey County, western central California, situated on the southern portion of Monterey Bay, and 84 miles S.E. of San Francisco; also close to Carmel Bay and Point Lobos. Is reached by land by the Southern Pacific railroad and the Monterey

and Fresno railroad. A line of steamers runs north to San Francisco, and another line south to Los Angeles and Santa Barbara. It is a resort frequented much by eastern people, who find the climate very beneficial. The fishing industry is carried on to a great extent, and fish is shipped from there to many eastern cities. When California was a Mexican province Monterey was its capital, and there are still to be seen many relics of the former old Mexican missions and churches. Monterey is the seat of a Catholic bishopric. Population 1890, 1,662; 1894, estimated 1,800.

MONTESANO, a post village, the capital of Chehalis County, central western Washington, 60 miles S. W. of Olympia, on the south bank of the Chehalis River, and 12 miles from its mouth. Is reached readily by the Northern Pacific railroad. Has three banks (one national bank with a capital stock of \$50,000, one incorporated bank and one private bank), two weekly newspapers, two saw-mills, a furniture factory, sash-and-door factory and tannery. There is good farming country in the surrounding district, and stock-raising is a thriving industry. Like Olympia, one of its principal industries is salmon fishing and canning. Population 1890, 1,632.

MONTVIDEO, a post village, the capital of Chippewa County, Minnesota, situated at the mouth of the Chippewa, where it enters the Minnesota River. Is reached by the Chicago, Milwaukee and St. Paul railroad. Has three weekly papers, seven churches, three banks, a state high-school and other schools, several elevators and two large flour-mills. Population 1890, 1,437; 1895, 1,800.

MONTZUMA, a post village and the capital of Poweshiek County, Iowa, in Jackson township, situated 62 miles E. of Des Moines. It is on the Chicago and Northwestern, the Grinnell and Montezuma, the Iowa Central and the Burlington, Cedar Rapids and Northern railroads. Its principal industries are farming and dairying. It also has extensive coal-fields. Population 1890, 1,062; 1895, 1,231.

MONTZUMA OR MOTEUCZOMA, DYNASTY OF. See MEXICO, Vol. XVI, pp. 209, 210; and CORTEZ, Vol. VI, pp. 441, 442.

MONTGOLFIER. See AERONAUTICS, Vol. I, p. 187.

MONTGOMERY, the capital of Alabama, has four railroads, the Louisville and Nashville, Western, Georgia Central and the Montgomery and Florida, which furnish connections with all inland points, while steamers connect with different lines for domestic and foreign ports. It is in a rich cotton-growing region. Its annual receipts are from 130,000 to 140,000 bales. Water is supplied by the Alabama River, also by an artesian-well system which furnishes 5,000,000 gallons daily. One of its handsomest buildings is the Masonic Temple. The city is lighted principally by electricity, and has 15 miles of electric street-railways. Among some of its manufactures are alcohol, candy, crackers, brooms and soap.

There are six brick-yards to supply the building-material. Large coal and iron mines are found



CAPITOL BUILDING, MONTGOMERY, ALABAMA.

within 60 miles of the city, and immense forests of pine are also in the vicinity. Population 1880, 16,713; 1890, 21,883. See Vol. XVI, p. 790.

MONTGOMERY, a post village in Orange County, New York, 70 miles N. by W. of New York City. It is on the Wallkill River, and on the Wallkill Valley and Montgomery and Erie railroads. Its principal industry is a paper-mill and woolen factory. It is in an agricultural and dairying region. Population 1890, 1,024.

MONTGOMERY, RICHARD, an Irish-American soldier; born near Feltrim, Ireland, Dec. 2, 1736; died in Quebec, Canada, Dec. 31, 1775. His father was a member of Parliament. The son graduated from Trinity College, Dublin. In 1758 he served at the siege of Louisburg under General James Wolfe. In 1762 he was promoted to a captaincy, and actively employed in expeditions against Martinique and Havana. In 1772 he sold his commission in the British army and in 1773 settled in New York City, where he bought an estate and married the daughter of Judge Robert R. Livingston. In 1775 he was appointed brigadier-general in the Continental Army and sent against Canada under General Schuyler. When the latter fell ill Montgomery assumed the leadership. After capturing St. Johns and Montreal, in 1775, his little army of about 400 men joined that of General Benedict Arnold before Quebec in December, and he was promoted to the position of major-general. Before moving, Montgomery called a council of war, at which it was decided to carry Quebec by assault. The attack was made on Dec. 31, 1775, at two o'clock in the morning, and during a snow-storm. It utterly failed: 400 Americans were captured, Arnold was wounded and Montgomery killed. He was buried in Quebec, with great honors from friends and foes. Even in the English Parliament his bravery was praised by Burke and North. Later, his remains were removed to a marble tomb ordered in France by Franklin, and erected in front of St. Paul's Church, New York City.

MONTGOMERY CITY, a post village of Montgomery County, Missouri, 82 miles W. of St. Louis, on the St. Louis, Kansas City and Northern and the Wabash railroads. Farming

and dairying are the chief occupations. The place contains a college, mill and manufactory. Population 1890, 2,199.

MONTH. See CALENDAR, Vol. IV, pp. 665, 666.

MONTHOLON, CHARLES TRISTAN, COMTE DE (1782-1853). See NAPOLEON, Vol. XVII, p. 225.

MONTICELLO, a town and the capital of Drew County, in southeastern Arkansas, on the St. Louis, Iron Mountain and Southern railroad, 85 miles S. by E. of Little Rock, the state capital, and 35 miles W. of the Mississippi River. It is located in a cotton-growing district, and there are large ocher-beds in the vicinity. Population 1890, 1,285.

MONTICELLO, a town and the capital of Jefferson County, in northern Florida, on the Savannah, Florida and Western and the Silver Springs, Ocala and Gulf railroads, 30 miles E. of Tallahassee and 142 miles W. by N. of Jacksonville. It is located in a cotton-growing region as well as a fruit-growing district. Population 1890, 1,218.

MONTICELLO, a post village, a railroad junction, and the county seat of White County, Indiana, 21 miles W. of Logansport and 75 miles S.W. of Indianapolis, on the Tippecanoe River, and on the Louisville, New Albany and Chicago railroad. It has manufactories of paper, furniture and woolen goods. Population 1890, 1,518.

MONTICELLO, a city and the capital of Piatt County, eastern central Illinois, on the Sangamon River, and on the Illinois Central and Wabash railroads, 56 miles N.E. of Springfield. Monticello is a thriving town, having many industries, prominent among which are a foundry, brick and tile works and a patent-fence factory. Much corn is grown in this district. Population 1890, 1,643.

MONTICELLO, a post village in Monticello township, Jones County, Iowa, situated near the extreme western boundary of the state, on the Chicago, Milwaukee and St. Paul railroad, 9½ miles N. of Anamosa, where the state penitentiary is situated. Monticello is a rich farming district, and has a factory where gloves and mittens are made; also manufactures feather dusters and feather trimmings. Population 1890, 1,938; 1895, 2,079.

MONTICELLO, a village and the capital of Sullivan County, northwestern New York, about 9 miles from White Lake. It is situated on the Port Jervis, Monticello and New York railroad. Its altitude, about sixteen hundred feet above the level of the sea, makes it a healthy resort for consumptives, and during the season many strangers are to be seen there. It is also known as a lumbering region, besides having a tannery in which fancy leather for bookbinding and other purposes is made. Population 1890, 1,016.

MONTMORENCY, FALLS OF. See QUEBEC, Vol. XX, p. 165.

MONTPELIER, a town in Bear Lake County, southeastern Idaho, north of North and Bear Lakes, on the Union Pacific railroad. It is

surrounded on the west by the Bear River range of mountains and on the north by the Aspen ridge and the Preuss range. It is an agricultural exporting town as well as a mining center. Population 1890, 1,174.

MONTPENSIER, ANTOINE MARIE PHILIPPE LOUIS D'ORLÉANS, DUC DE, a French prince and Spanish soldier; born at Neuilly, France, July 31, 1824, being the fourth son of Louis Philippe, Duc d'Orléans (King of the French from 1830 to 1848). After studying at the Henri IV Lyceum in Paris, he entered the artillery as a lieutenant in 1842 and joined the army in Algeria in 1844, where he was slightly wounded on the battle-field; he made an extensive journey through eastern Europe, and had just been promoted brigadier-general in 1846 when he married the Infanta Marie Louise Ferdinande, sister of Queen Isabella II of Spain, to the great vexation of the English government. Banished from France in 1848 with the rest of the Orleans family, he settled in Spain, where he was made Infante, and appointed captain-general in 1859. When Isabella lost her throne in 1868 he was compelled to leave Spain, but soon decided to recognize the new government and was allowed to return to his Seville palace. A cousin of Queen Isabella, Don Henri of Bourbon, challenged the duke on account of his conduct toward the ex-sovereign. The meeting took place March 12, 1870, when Don Henri was shot through the heart. Seeing his candidacy to the throne rejected by the Cortes, and Amedeo, Duke of Aosta, the second son of King Victor-Emmanuel of Italy, elected to the supreme office, he resigned his rank in the army and was exiled to the Balearic Isles. On Amedeo's resignation in 1872 he favored the choice of Don Alphonse, Queen Isabella's only son. When the latter took possession of the Spanish throne as Alphonse XII, the duke resumed all his honorary functions. He died at San Lucar, near Seville, Spain, Feb. 4, 1890. He left one son, Don Antonio, married to the Infanta Eulalia, who visited Chicago in 1893, and three daughters, one of whom was Doña Mercedes, the first wife of Alphonse XII.

MONTREAL, MOREALE OR MONREAL D'ALBAENO. See CONDOTTIERI, Vol. VI, p. 256.

MONTROSE, a town and the capital of Montrose County, western Colorado. It is on the Denver and Rio Grande railroad and on the Uncompahgre River. Fort Crawford Station is 6 miles S. and Denver is 353 miles N.E. It is in a farming and fruit-growing district. Population 1890, 1,330.

MONTROSE, a post borough, the capital of Susquehanna County, Pennsylvania, eight miles from Montrose Station. It is on the Delaware, Lackawanna and Western and the Montrose division of the West Shore railroads. It is two thousand feet above sea-level, and is much frequented as a summer resort. It is located in an agricultural region, and has manufactures of farming-implements and leather, etc. Population 1890, 1,735.

MONTS, PIERRE DU GUAST DE, director French

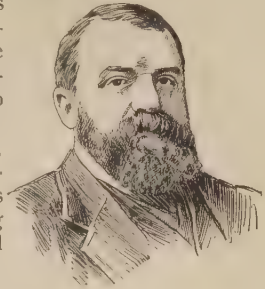
Canadian Company (1560-1611). See GEOGRAPHY, Vol. X, p. 187.

MONTT, MANUEL, a Chilean statesman; born at Petoeia, Chile, Sept. 5, 1809; graduated from the National Chilean Institute, and was professor there for a time. In 1836 he became Assistant Secretary of State; in 1841 president of the Congress, and afterward cabinet officer under several administrations. He was elected President of Chile by the Conservatives in 1851, subdued a stubborn rebellion, and was re-elected in 1856, remaining in office until 1861. In 1858 and 1859 he had to overcome terrible disorders, which caused much bloodshed and the exile of a number of prominent Chileans. When his last term had expired he turned over his office peacefully to Perez, his successor. From 1844 until his death (except while serving as minister or President) he was president of the supreme court. He organized the University of Chile, and effected many reforms. In politics he headed the ultra-Conservative party, dominated by the Roman Catholic priesthood. He died at Santiago, March 13, 1881.—His son JORGE, a Chilean sailor and statesman, was born in Santiago in 1847. He had a brilliant career on the sea, especially during the Chilean-Peruvian war, and rose to the rank of captain. He took sides with Congress against President Balmaceda, and helped in his final overthrow. As a reward he was promoted to a vice-admiralship. Having been chosen a member of the provisional junta of government, he was elected, Nov. 6, 1891, President of the Republic. His term expired in September, 1896, and was, on the whole, a period of peace and recuperation for his country. See also CHILE, in these Supplements.

MONTYON PRIZES, rewards for signal instances of philanthropy discovered throughout the year, awarded by the French Academy, according to the will of Jean-Baptiste-Robert Auger, Baron de Montyon, who bequeathed \$600,000 to public hospitals, and the remainder of his fortune to give sums of money to poor patients on leaving Paris hospitals, and to found the prizes since connected with his name. The Academy of Sciences also awards annually a prize of 10,000 francs to the individual who has discovered the means of making any mechanical occupation more healthy, and another of equal value for improvements in medicine and surgery; while the Forty themselves award the prizes of virtue, and another series of prizes to the writers of the works likely to have the greatest beneficial influence on morality—the total apportioned to each category of prizes being 10,000 francs annually.

MOODY, DWIGHT LYMAN, an American evangelist; born at Northfield, Massachusetts, Jan. 5, 1837. He was for a while a farm-hand, later a salesman in Boston, and in 1856 went to Chicago, where he engaged with remarkable success in Sunday-school work. During the war he was sent among the troops at the expense of the Christian Commission, and at its close the Young Men's Christian Association of Chicago built for him a

large hall wherein to give revival meetings. It was burnt in 1871, but rebuilt since on a much larger scale. In 1870 he was joined by Ira David Sankey, a singer whose voice possessed much sweetness and power, who was born in Edinburg, Pennsylvania, Aug. 28, 1840. In 1873 they visited Great Britain as evangelists, attracting crowds, and afterward worked in America. Mr. Moody has founded religious schools at Northfield, Massachusetts, where he makes his home, without abandoning his evangelizing tours. Has written books that have had a large circulation, among them *The Second Coming of Christ* (1877); *The Way and the Word* (1877); *The Way to God and How to Find it* (1884); and many volumes of sermons.



DWIGHT L. MOODY.

MOON ALPHABET. See BLIND, Vol. III, p. 827.

MOONEY, JAMES, an American ethnologist; born in Richmond, Indiana, in 1861; had only a common-school education, but from the age of 12 showed a decided taste for ethnographic studies, and began compiling a systematic, geographical list of all the Indian tribes in both Americas. While pursuing his researches he learned the printer's art, and practiced it, either as an apprentice or a compositor, for over six years. His list of 3,000 tribes, being completed as far as his resources went, in 1885 was submitted to the United States Bureau of Ethnology, in Washington, and accepted as one of the bases of a *Dictionary of Tribal Synonyms*. He subsequently discovered the whole sacred ritual of the Cherokee priesthood, and collected new data concerning the South Atlantic Indians. He investigated for the government the ghost-dance among the western tribes, and gathered an exhaustive collection of curios, etc., relating to the Kiowa tribe, which were exhibited in the ethnological section of the Columbian Exposition. He wrote *Medical Mythology of Ireland* (1887); *Funeral Customs of Ireland* (1888); *Holiday Customs of Ireland* (1889); besides the monographs above mentioned, published in periodicals or in government reports.

MOON-EYE. See GOLD-EYE, in these Supplements.

MOONSTONE. See MINERALOGY, Vol. XVI, p. 419.

MOORE, a family of English artists of distinction. The father, WILLIAM, was a portrait and landscape painter of some reputation.—His eldest son, HENRY, born in York, England, March 7, 1831, received his artistic education first in his father's studio and later at the Langham Schools; exhibited for the first time at the Royal Academy in 1853. He devoted himself to marine and landscape painting. His work

was appreciated in France much sooner than in his own country. He was awarded the Grand Prix at the Paris Exposition of 1889, and made a knight of the Legion of Honor. In 1893 he was elected a member of the Royal Academy. His technique and his comprehension of color were strikingly original, and yet true to nature. He sent to the Philadelphia Centennial Exhibition (1876) *A Winter Gale in the Channel* and *Storm Coming on at Sunset, Coast of Wales*; his *Summer Breeze on the Channel* was awarded a special diploma (1894); other famed pictures by him are *Rough Weather on the Mediterranean* and *A Bright Morning After a Gale* (1878). He died in 1895.—His brother, ALBERT JOSEPH, was born in 1841. He also studied at the Langham Schools; made his specialty of the human figure treated decoratively, and reached a high rank among modern artists. Here are the titles of some of his best paintings: *Battledore* and *Shuttlecock* (1871); *Beads* and the *Palm Fan* (Paris Exposition, 1878); *Shells*; *The Flower Walk*; *The Marble Seat*. He died in 1893.

MOORE, CLEMENT CLARKE, an American educator, and the son of BENJAMIN CLARKE MOORE, a Protestant Episcopal bishop of New York; born in New York City, July 15, 1779; graduated at Columbia College in 1798; studied theology, but never took orders, devoting himself to classical and oriental literatures; made a gift to the General Theological (Protestant Episcopal) Seminary of the plot of ground in New York City whereon the present buildings were erected, in 1818; he became a professor in the seminary first of Biblical learning in 1821, later of Greek and Oriental literatures, a chair he occupied until 1850, being considered the pioneer of Hebrew teaching in this country. He wrote the first *Hebrew and Greek Lexicon* (2 vols., 1809) published in America; he compiled his father's sermons, and wrote a volume of *Poems* (1844), among which is found the well-known poem, "Twas the Night Before Christmas." He died in Newport, Rhode Island, July 10, 1863.

MOORE, DAVID HASTINGS, an American clergyman and journalist; born in Athens, Ohio, Sept. 4, 1838; graduated at Ohio University in 1860; entered the Methodist Episcopal ministry the same year; entered the Union army as a private in 1862; was successively captain of the Eighty-seventh Ohio and major and lieutenant-colonel of the One Hundred and Twenty-fifth Ohio regiments, and served until the fall of Atlanta, when he resumed his profession and occupied several pastorates in the Ohio conference; appointed president of the Wesleyan Female College, Cincinnati, Ohio, in 1875-80; president of Colorado Seminary and first chancellor of the Denver University in 1880-89, when he accepted the chair of political economy at the Colorado University, and began editing the *Western Christian Advocate*.

MOORE'S HILL, a village in Sparta township, Dearborn County, Indiana, on the Ohio and Mississippi railroad, 40 miles W. of Cincinnati. The vil-

lage is prominent only as being the seat of Moore's Hill College, an institution for both sexes, organized in 1854. It is Methodist Episcopal, having in 1896 nine instructors, 128 students and 3,000 volumes.

MOOR-FOWL or RED GROUSE. See GROUSE, Vol. XI, p. 222.

MOORHEAD, a city and the capital of Clay County, western Minnesota, two miles from Fargo, North Dakota, on the Great Northern and the Northern Pacific railroads; is situated in a level and fertile region, and is one of the most important stations on the railroad. It has large flouring-mills and elevators. Population 1890, 2,088; 1895, 3,290.

MOORS. See AFRICA, Vol. I, pp. 261, 262.

MOORUK. See CASSOWARY, Vol. V, p. 186.

MOOSE. See DEER, Vol. VII, p. 24.

MOOSEHEAD LAKE. See MAINE, Vol. XV, p. 298.

MOQUI INDIANS. See PUEBLO INDIANS, in these Supplements.

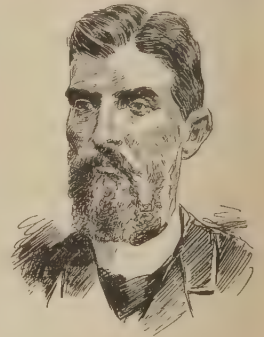
MORAES-BARROS, PRUDENTE JOSÉ DE, a Brazilian statesman; born in Sao Paulo state, Brazil, in 1845; educated in the State University, where he graduated in law. During the empire he made his political début in the Chamber of Deputies, where he and Campos Selles were the only avowed Republicans. After the deposition of Dom Pedro and the proclamation of the Republic in 1890, he was one of the triumvirate who took in their hands the direction of affairs in Sao Paulo. His native province sent him to Rio, where he presided over the labors of the constituent assembly and gained great influence. On the organization of the Senate he was elected Vice-President, and at the time of the first Presidential election in 1891 was nominated by an influential section of the moderate Republicans to stand against Marshal Deodoro da Fonseca; he failed to secure election, but received a large number of votes. Shortly afterward he was elected president of the senate. On March 1, 1894, at the height of the great rebellion, Moraes was elected President by an overwhelming majority, to succeed President Peixoto. He adopted a peaceful and constitutional policy, and contributed powerfully to the pacification of the country.

MORAINE. See GEOLOGY, Vol. X, pp. 281, 282.

MORALITIES. See DRAMA, Vol. VII, p. 415.

MORAL PHILOSOPHY. See ETHICS, Vol. VIII, pp. 574-611.

MORAN, a family of distinguished American artists, who settled in the United States in 1844. The eldest brother, EDWARD, was born in Lancashire, England, in 1829; he studied in Philadelphia under James Hamilton, the marine painter, and Paul Weber, the landscape artist; he studied in London (1862-69), when he returned to this coun-



P. J. MORAES-BARROS.

try; he sojourned in Paris (1877-88); was elected an Associate National Academician. Among his best-known paintings, drawings and etchings are *The Hawk's Nest*; *Minot Ledge Light*; *The Winning Yacht*; *Moonlight on New York Bay*; and *Coming Storm Over New York Bay*—(his five exhibits at the Centennial Exhibition, 1876); also, *Launch of the Lifeboat*; *The Lord Staying the Waters*; and *Off Cape Hatteras*.—His brother THOMAS was born Jan. 12, 1837, in Bolton, England; starting as a wood-engraver, he also had James Hamilton as his teacher in painting. He studied in London, Paris and Italy, and adopted landscape as his specialty. He joined the United States expedition to the Yellowstone region in 1871, and collected sketches for his *Grand Cañon of the Yellowstone* and *The Chasm of the Colorado*, two superb pictures bought by Congress for \$10,000 each and hung in the capitol in Washington. His skill as an etcher is widely recognized, and he has been made a member of the leading American and British art societies. He was made a National Academician in 1884. He exhibited at the Centennial Exposition *The Mountain of the Holy Cross*. Other notable pictures by him are *The Last Arrow*; *The Children of the Mountain* (Paris Exposition, 1867); *Ponce de Leon in Florida*; *A Dream of the Orient*.—Another brother of Edward and Thomas, PETER; born in Bolton, England, in 1842; studied under his brother Edward, and in London. Painted studies of animal life and landscapes. In 1876 he exhibited *The Return of the Herd* and *A Settled Rain*. Other pictures by him are *Twilight*; *After the Chase*; *A Sunny Slope*. He is also one of our best American etchers.—A son of Edward, PERCY; born in Philadelphia in 1862; studied under his father, and later for four years in Paris. He soon made his mark as an etcher and a water-colorist; also as a portrait-painter of much grace and strength. His *Divided Attention* received the first prize of the National Academy in 1886. Other prominent works of his are *A Corner of the Studio*; *A Japanese Fantasy*; *I Am Ready* (1886); *The Rehearsal for the Ball* (1887).—Another son of Edward, LEON; born in Philadelphia, 1863; studied under his father and also in London and Paris; settled in New York City, devoting himself to genre painting. He exhibited *Waylaid* (1885); *An Interrupted Conspiracy* (1886); *The Duel*; *An Idyl*; *Intercepted Dispatches*.—The wife of Edward, MARY NIMMO; born in Strathaven, Scotland, 1842; came to this country in 1852. She married Mr. Edward Moran, who was her art-teacher, in 1863. She is a very artistic etcher, and finally devoted herself to that branch of art. Among her finest plates are *The Coast of Florida*; *Summer at Easthampton*; *Under the Oaks*; and *A Windmill and a Pond*.

MORAVIA, a village of Cayuga County, New York, 17 miles S.E. of Auburn, on the Lehigh Valley railroad, and at the inlet of Owasco Lake. It is the shipping-center of a fertile farming region, and has manufactures of farm-implements and water-wheels. Population 1890, 1,486.

MORAVIAN BRETHREN IN AMERICA. The American Moravians consider themselves legiti-

mate successors of the *Unitas Fratrum*. (See Vol. XVI, pp. 811, 812.) They claim an unbroken succession of bishops from the apostles, through an Austrian branch of the Waldenses. The first settlement of Moravian Brethren in America was at Savannah, Georgia, in 1735, where it was abandoned five years later, and a new colonization begun at Bethlehem, in the Lehigh valley of Pennsylvania. It is their headquarters and the seat of their theological seminary and college. They also founded Lititz and Nazareth, in the same state, and Salem, in North Carolina, all of which were at first exclusive communal towns, similar to those founded by the renewed *Unitas Fratrum* in Germany and Great Britain. The principle of exclusivism, which is dying out in Europe, was entirely abandoned in America, the last vestige of it disappearing in 1856. The early history of the Moravian church in America is full of heroic incidents of missionary work among the Indians, and, apart from William Penn, no name figures more conspicuously in the early solution of the Indian problem than that of their distinguished missionary, David Zeisberger, who spent 62 years among the aborigines, establishing towns and villages of his converts.

The American province of the Moravian Church, which is responsible to the Unity's Elders' Conference at Berthelsdorf, Germany, has two divisions, a northern and a southern, each with its own provincial synod. The northern division is divided into five districts, covering convenient territorial limits, delegates from which compose the synod. All the important acts of the synod, however, are subject to the ratification of the Unity's Elders' Conference, including the selection of bishops. Election by "apostolic lot" is no more practiced, except occasionally by special request, in the selection of bishops. Marriages by "lot" were abolished by the General Synod in 1818. In 1895 the northern province comprised 80 congregations, with a total membership of 16,329; contributed \$111,276 for church support, and \$23,343 for missions, pensions, etc. The southern province reported a total membership of 3,548. The synods meet once in five years. The missionary work of the church, in proportion to its numerical strength, is very extensive. The American province, aided by the Unity's Elders' Conference, sustains missions in Greenland, Labrador, and among the North American Indians in central and southern America and in Alaska, the latter including 9 stations, 12 missionaries, 14 native assistants and some 400 converts. The general missionary work controlled by the parent church in Germany extends to nearly all quarters of the globe. The theological school at Bethlehem has an endowment of \$75,000, a six-years' course of study and an average of about fifty students. Four general schools are located at Bethlehem, Lititz and Nazareth, Pennsylvania, and at Salem, North Carolina, respectively. Two weekly papers and a Sunday-school paper are issued from the publishing-house at Bethlehem, and also an American edition of the *Text-Book*, the official year-book of the denomination. See *History of the United Brethren in Christ*, J. Lawrence; *Historical Sketches of Bethlehem and the Moravians*, J. H.

Martin (1873); *Life and Times of David Zeisberger*, E. de Schweinitz (1870).

MORAY, JAMES STUART, EARL OF. See MURRAY, Vol. XVII, p. 62.

MORAY FIRTH. See ROSS COUNTY, Vol. XX, p. 854.

MORAYSHIRE OR ELGINSHIRE. See ELGIN, Vol. VIII, p. 129.

MORDANTS. See DYEING, Vol. VII, p. 573.

MOREA. See GREECE, Vol. XI, p. 81.

MOREAU, GUSTAVE, a French painter; born in Paris, France, April 6, 1826; studied under Picot and in the National School of the Fine Arts; sent a *Pieta* as his first Salon exhibit in 1852. The next year two colossal canvases, *Darius après la Bataille d'Arbelles* and an episode from the *Cantique des Cantiques*, were purchased from him by the French government; he devoted himself henceforth to mythological, religious and historical subjects. In 1888 he was made an Academician, and in 1892 a professor at the School of the Fine Arts. His paintings have all been warmly discussed, as their philosophical and literary intentions are no less *en évidence* than his qualities and defects as a painter. His *Orphée déchiré par les Ménades* (1866) is at the Luxembourg Palace Museum. *Œdipe et le Sphinx* caused a great sensation at the Salon of 1864.

MOREAU, MATHURIN, a French sculptor; born in Dijon, France, Nov. 18, 1822; studied in Paris under Ramey *fils* and Dumont; in 1848 he made his début at the Paris Salon. He obtained a second medal in 1855, a first medal in 1859, medals at the Paris Expositions of 1867 and 1878, and a gold medal in 1889. Was mayor of Paris in 1885. His style is more graceful than strong, and his works are more frequently busts and statuettes than statues of life or heroic size. Napoleon III bought his *La Fée aux Fleurs*.

MOREHEAD CITY, the capital of Carteret County, North Carolina, on Bogue Sound, five miles W. by S. of Beaufort. It is on the Atlantic and North Carolina railroad, is connected with Beaufort by steam-ferry, and has regular steamship communication with New York City. Population 1890, 1,064.

MOREL, edible fungus. See MUSHROOM, Vol. XVII, p. 76.

MORELOS, a state of Mexico, bounded north by the State of Mexico, east by Puebla and southeast by Guerrero. It is the smallest of the Mexican states excepting Tlaxcala, having an area of only 1,650 square miles. Its surface is most irregular, having in the northern portion of the state the snowy cone of Popocatepetl and in the southern portion warm valleys, where the greater part of the population is gathered. Sugar and rum are its principal exports, and sugar-cane is cultivated extensively. Cuernavaca, situated in the southern portion of the state, is its capital; and Cuautla, with 16,000 inhabitants, is its largest city. Population 1892, 143,540.

MORELOS Y PAVON, JOSÉ MARIA, a Mexican patriot; born at Valladolid, near Apatzingan, Mexico, Sept. 30, 1765. His birthplace, Valladolid, was renamed Morelia in his honor. Born of poor

parents, his early manhood was spent as a muleteer between Mexico and Acapulco. When only 30 years old was he able to meet the expense of a college education; in 1800 he graduated as a priest and obtained a parish. He assisted his old college rector, Miguel Hidalgo, when the latter proclaimed independence from Spain in 1810, capturing Acapulco and a large amount of arms, ammunition and supplies. After temporary defeats he conquered every place on the Pacific coast, entering Tixtala, Aug. 16, 1801, after gaining 22 victories over the Spaniards. Besieged in Cuautla by much superior forces, he finally broke through the enemy's lines and captured Orizaba and Oajaca in November, 1812. Having organized a government he called a congress, which met at Chilpancingo, and on Nov. 6, 1813, signed the Mexican Declaration of Independence. Marching upon Valladolid with twenty thousand men to capture the city and make it the provisional capital, Morelos was defeated twice by Iturbide, and finally, in January, 1814, fled to Acapulco. He joined the Congress at Texmacala, and was elected one of the Supreme Triumvirs, Oct. 2, 1814. Routed by General Concha, November, 1815, he was made a prisoner and sent to Mexico City, where, after being compelled to perform penance before the Inquisition, he was shot, Dec. 22, 1815.

MORENCI, a village of Lenawee County, southern Michigan, on the Wabash railroad. It is 80 miles S.W. of Detroit; has various manufactures of lumber, brick and tile machine works and yards; also a creamery and cheese factory. Population 1890, 1,248; 1894, 1,310.

MORES, ANTOINE AMÉDÉE MARIE VINCENT MANCA, MARQUIS DE, a French soldier and adventurer; born in Paris, France, June 18, 1858; son and heir of the Duc de Vallombrosa; graduated from St. Cyr Military School and entered the French cavalry as a lieutenant in 1878; resigned in order to marry the daughter of Banker von Hoffmann of New York in 1880; undertook to organize a company that was to deliver meat straight "from range to stall," and superintended the western terminus of the deal, at Medora, on the Northern Pacific railroad. While there he was tried for the murder of a cowboy in a frontier fight, but was acquitted. The enterprise was abandoned, after costing von Hoffmann \$1,000,000. Settling in Paris, he plunged into Socialistic and Jew-baiting schemes, and fought two duels on that account, both times wounding his adversaries severely. Early in 1896 he organized an expedition through the Regency of Tripoli for the purpose of antagonizing the British advances in the Soudan by means of uprisings of Arab tribes. In May of the same year news arrived that he had been murdered by his treacherous allies.

MORESNET, a small, neutral territory, between the boundaries of Prussia and Belgium, 4 miles S.W. of Aix-La-Chapelle. It contains the famous and very valuable zinc mines of the Vieille Montagne, Altbarg, the property of a wealthy Belgian corporation. This territory, which was created by the Treaty of Vienna in 1816, and which fixed the limits between Westphalia and the Netherlands, is

70 miles square, and is governed by a burgomaster and a common council. There are also a Belgian township of Moresnet and a Prussian township of the same name, on either side of the independent territory.

MORGAN, CONWAY LLOYD, an English scientist; born in London, Feb. 6, 1852; graduated at the Royal School of Mines, London; spent five years in South Africa as lecturer on science at Rondebosch, near Cape Town (1878-83); returning to England, he entered Bristol University College as instructor and rose to be its principal. Wrote *Animal Biology* (1887); *Animal Life and Intelligence* (1890); and *Introduction to Comparative Psychology* (1894).

MORGAN, DANIEL, an American soldier; born in Hunterdon County, New Jersey, in 1736, of humble Welsh parentage; he began his military career in 1755 as a teamster for the army under Braddock. After displaying much bravery in that campaign and the following against the French and their Indian allies, he was made an ensign by Governor Dinwiddie. From 1762 to 1775 he prospered as a farmer in Virginia, and grew wealthy. Made a captain in the Virginia contingent of volunteers called out by Congress in 1775, he took part in the march of Arnold against Quebec, but his reckless bravery caused him to be captured at the end of the famous attack that cost Montgomery his life. Released in 1777, he raised a regiment and distinguished himself greatly at the battle of Freeman's Farm on Sept. 19, 1777. He withdrew from service in 1779 on account of ill-health. Promoted to be brigadier-general in October, 1780, he took a command under General Greene and gained, at Cowpens, one of the most brilliant victories of the war on Jan. 17, 1781. A few weeks later illness forced him to return home. He later rose to be major-general and was elected to Congress in 1796. He died in Winchester, Virginia, July 6, 1802.

MORGAN, EDWIN DENNISON, an American statesman; born in Washington, Massachusetts, Feb. 8, 1811. Entered business when seventeen years old and after a successful career as a merchant in Hartford, Connecticut, and New York City, served in the New York state senate, (1850-53,) and was chairman of the Republican National Committee (1856-64). Elected governor of New York in 1858, he served in the most critical period of the war during the year 1862,



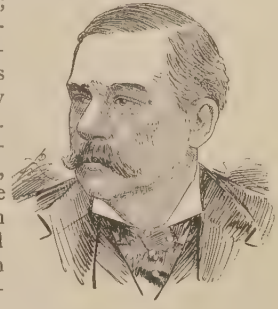
EDWIN D. MORGAN.

supervising the raising and equipment of about 220,000 soldiers. He declined the office of Secretary of State offered him by President Lincoln in 1865, and the office of Secretary of the Treasury offered him by President Arthur in 1881. He died in New York City, Feb. 14, 1883, leaving by will \$795,000 to religious and charitable institutions. He was United States Senator, 1863-69.

MORGAN, SIR HENRY JOHN. See BUCCANEERS, Vol. IV, p. 409.

MORGAN, JOHN HUNT, an American soldier; born in Huntsville, Alabama, June 1, 1826; settled in Kentucky (with his parents) in 1830; took part in the Mexican campaign as a first lieutenant of cavalry. He raised a body of cavalry for the Confederacy and attained a wide notoriety as the leader of a number of costly raids into Kentucky, Ohio and Indiana. He received a major-general's commission, but was controlled direct by the Confederate Secretary of War. On one of his raids in 1863 he was captured with most of his command and was imprisoned in the Ohio Penitentiary at Columbus. From this he escaped by tunneling under the walls, and while leading another raid in Tennessee was shot by Federal troops, Sept. 4, 1864.

MORGAN, JUNIUS SPENCER, an American banker; born in Holyoke, Massachusetts, April 14, 1813; during his minority employed in the business house of Alfred Welles, Boston; in 1834 entered the banking-house of Morgan, Ketchum and Company, New York City, shortly returning to New England and becoming junior partner in a dry-goods establishment—afterward known as Mather, Morgan and Company; subsequently formed a partnership with James M. Beebe and Company, of Boston, one of the largest dry-goods houses in the country. In 1853 Mr. Morgan visited England and became partner in the firm of George Peabody and Company, upon Mr. Peabody's death becoming J. S. Morgan and Company, one of the most important banking establishments in the world. Mr. Morgan was active in religious and other charities, having made liberal donations to Trinity College and the Hartford Orphan Asylum; he also presented valuable works of art to the Metropolitan Museum of Art, in New York City. His wife was a daughter of John Pierpont, the poet. He died in Monaco, April 8, 1890.—His son, JOHN PIERPONT, the well-known banker, was born in Hartford, Connecticut, April 17, 1837; educated at the high-school in Boston, completing his studies abroad at the University of Göttingen, Germany. In 1857 he entered a banking-house in New York, and in 1860 became American agent of the firm of George Peabody and Company, London. In 1864 he entered the banking-house of Dabney, Morgan and Company as junior partner, and in 1871 joined the house of Drexel, Morgan and Co., a branch of the Paris house of Drexel, Harjes and Company. He developed signal ability in the conduct of railroad affairs, being particularly successful in improving the financial condition of the Philadelphia and Reading railroad, besides being active in the reorganization of the West Shore railroad and its ab-



JOHN PIERPONT MORGAN.

sorption by the New York Central. In 1895 Mr. Morgan was mainly instrumental in conducting to a successful issue the affairs of a powerful bond syndicate, formed with the object of purchasing United States 4 per cent bonds designed to maintain the legal gold reserve. To his skill and foresight was largely due the result that from the end of January, 1895, to the middle of July not a dollar in gold was sent abroad, and not until the end of August was a gold shipment made by any banking-house of prominence, foreign bankers loyally co-operating in the measures adopted by the bond syndicate. Mr. Morgan was a liberal contributor to the fund devoted to the establishment of a free library in Hartford, giving \$50,000 for that purpose.

MORGAN, JOHN TYLER, an American soldier and statesman; born in Tennessee, June 20, 1824; obtained an academic education and then studied law in Alabama; in 1845 he began practicing law in his native state. In 1860 he was a Presidential elector on the Breckenridge ticket, and in 1861 entered the Confederate service as a private. He commanded a regiment in Alabama, was commissioned brigadier-general in November, 1863, and commanded a division under Longstreet, Joseph E. Johnston and John B. Hood. In 1877 he was sent to the United States Senate, and was re-elected in 1883, 1889 and 1895. His worth as a legislator was recognized by his appointment as one of two United States commissioners in the Board of Arbitration to which was submitted the Bering Sea controversy.

MORGAN, LEWIS HENRY, an American archaeologist; born at Aurora, New York, Nov. 21, 1818. He graduated at Union College in 1840, and practiced law in Rochester. He served in the state assembly in 1861 and in the senate in 1868. Morgan's earliest work *The League of the Iroquois*, was the first account of the organization and government of an Indian tribe. He wrote several works of anthropological value. He died Dec. 17, 1881.

MORGANATIC MARRIAGE. See MARRIAGE, Vol. XV, p. 569.

MORGAN CITY (formerly BRASHEAR), a village and port of entry to St. Mary's Parish, Louisiana, situated in the southern portion of the state, 80 miles W. by S. of New Orleans, is on the Southern Pacific railroad and has a regular steamship communication with Texan, Cuban and Mexican points; sugar-cane is the leading product of the district; has also large oyster, fish and vegetable interests. The port is accessible to vessels drawing 15 feet of water. Population 1890, 2,291.

MORGANFIELD, a town and the capital of Union County, Kentucky, in the northwestern portion of the state; the town was founded in 1811, and is on the Ohio Valley railroad, 5 miles S. of the Ohio River and 39 miles S.W. of Evansville, Indiana. Tobacco is the leading product of the district. Population 1880, 744; 1890, 1,094.

MORGANTON, a town and the capital of Burke County, northeastern North Carolina, on the Catawba River and the Southern railroad, 55 miles W. of Statesville, 64 miles N.W. of Charlotte. Here are situated the State Hospital for the Insane and the

State School for the Deaf and Dumb. The region is both an agricultural and a mineral one. Population 1890, 1,557.

MORGANTOWN, a village and the capital of Monongahela County, West Virginia, on the Monongahela River and the Baltimore and Ohio railroad, about 56 miles S.E. of Wheeling and 106 miles S. of Pittsburg, with which latter city it has regular steamboat communication. It has several mills, a women's seminary, and is the seat of the West Virginia University, a non-sectarian institution for both sexes, founded in 1867, and in 1896 having 25 instructors, 322 students, and a library containing 10,965 volumes. Population 1890, 1,011.

MORGARTEN. See SWITZERLAND, Vol. XXII, pp. 783, 793.

MORILLO, PABLO (1777-1838). A Spanish general, once a guerrilla leader, who died in exile. See BOLIVAR, Vol. IV, p. 8.

MORISON, JAMES, Scotch pastor. See EVANGELICAL UNION, Vol. VIII, pp. 725, 726.

MORLEY, HENRY, English educationist and author, was born in London, Sept. 15, 1822, and died there May 24, 1894. He was educated in Germany and at King's College, London, where he edited for a time the collegiate magazine. For four years he practiced medicine, but in 1848 turned to educational and journalistic work, and later to literature, editing the *Examiner* and contributing to *Household Words* and other periodicals. In 1857 he was appointed lecturer on English literature at King's College, London, and in 1865 became professor of English language and literature at University College, an office which he resigned in 1889. His earliest works include biographies of *Palissy*, the *Potter* (1852); *Jerome Cardan* (1854); and *Cornelius Agrippa* (1856). In 1857 appeared *Gossip and Memoirs of Bartholomew Fair*; a volume of *Fairy Tales* (1859); *Journal of a London Playgoer* (1862); *Sketches of Russian Life* (1866). In 1864 he commenced the issue of a number of works, including illustrative extracts, on English authors, designed to cover the whole period of English literature. The first of these were *English Writers before Chaucer* (1864); and *From Chaucer to Dunbar* (1867). These two works were afterward embraced in the series of *English Writers from the Earliest Period to the Times of Shakespeare*, published in 11 volumes (1864-93). In 1873 he put forth a *First Sketch of English Literature*, and within the years 1876 and 1882 issued the *Library of English Literature*, in five volumes, down to the reign of Queen Victoria. He also edited a series of over two hundred volumes of English authors, entitled *Cassell's National Library*, and for Routledge and Son the series (63 volumes) known as *Morley's Universal Library*. The latter included approved translations of a few of the classics and the more notable works in foreign and English literature. To this series he added *The Carisbrooke Library* (14 volumes), consisting of the works of Swift, Defoe, Gower, Milton's prose works, Gibbon's memoirs and Machiavelli's *Florence*. A useful compilation, *Tables of English Literature*, appeared in 1870, with annotated editions of Boswell's *Johnson* and Addison's *The Spectator*.

MORLEY, JOHN, English statesman and author, was born at Blackburn, Lancashire, Dec. 24, 1838.



JOHN MORLEY.

He was educated at Cheltenham and at Lincoln College, Oxford, taking his degree in 1859. He was called to the bar, but chose literature as a profession. From 1867 till 1882 he was editor of the *Fortnightly Review* and was also editor of the *Pall Mall Gazette* from 1880 till August, 1883, and of *Macmillan's Magazine* from 1883 to 1885. Within

these years Mr. Morley also produced a large mass of original work, in addition to editing nearly forty volumes of the "English Men of Letters" series. His more important writings include treatises on *Voltaire* (1872); *Rousseau* (1876); and *Diderot and the Encyclopædists* (2 vols., 1878); besides two volumes of *Critical Miscellanies* (1871-76); a thoughtful work *On Compromise* (1874); a study of Walpole (1889), for the Twelve English Statesmen series; and a memoir of Richard Cobden, the apostle of Free Trade (1881). For a number of years this versatile and diligent man was an active and hard-working member of the Gladstonian and Rosebery governments, showing in the House of Commons and elsewhere ability and earnestness as a speaker. In 1883 he was returned to Parliament as an advanced Liberal for Newcastle-on-Tyne. On the formation (February, 1886) of Mr. Gladstone's Home-Rule government, Mr. Morley became Chief Secretary for Ireland. His Parliamentary career revealed him as both radical and independent—a man who strove rather to shape than follow the policy of his party. His other published writings include *Edmund Burke* (1867), a skillful and critical study of his times and his work. He also wrote the monograph on *Burke* in the Morley series of English Men of Letters; an essay on *The Study of Literature* (1894), and a volume of *Critical Studies in Literature* (1891), included in the edition of his *Collected Works* (11 vols., 1894-95). At the general election in England, in 1895, Mr. Morley lost his seat for Newcastle-on-Tyne, but in February, 1896, he was returned in a by-election for Montrose Burghs, Forfarshire, Scotland.

MORLEY, SAMUEL, an English merchant and philanthropist; born in London, England, Oct. 15, 1809; succeeded his father as a prosperous manufacturer of hosiery; was a strong agitator in favor of total abstinence, and a zealous Congregationalist. He was returned to Parliament for Nottingham as a Liberal in 1865; was unseated on petition; represented Bristol from 1868 to 1885, and declined a peerage which was offered to him in the latter year. He donated a large portion of his wealth to religious and philanthropic undertakings. He died near Tonbridge, Sept. 5, 1886.

MORMONS. See Vol. XVI, pp. 825-828; and LATTER-DAY SAINTS, in these Supplements.

MORNING-GLORY FAMILY, a name some-

times applied to the family *Convolvulaceæ* on account of its most prominent genus, *Ipomœa*, whose species are the true morning-glories. Besides the morning-glories the family contains the bind-weeds (*Convolvulus*), the curious parasitic twiners known as dodders (*Cuscuta*), and several other genera not so popularly known.

MOROCCO. Since 1892 this semi-barbarous sultanate has had repeated troubles with European powers, reminding one strongly of the incidents that preceded the conquest of Algeria by the French in 1830. In 1892 an English envoy was dismissed curtly by Sultan Mulai-Hassan, who showed open preference for the French consul-general. In 1893 British iron-clads were sent to the coast of Morocco, but were not called upon to act. The forts of Ceuta and Melilla, on African soil, are occupied by Spanish troops; the latter position was attacked Oct. 2, 1893, by 6,000 insurgent Moors, generally known as "Riffians," who were repulsed with heavy losses. The Sultan offered to make full reparation and to grant further territory around the forts, but proved totally unable to cope with the insurgents, who increased in number and began a regular siege of Melilla. In spite of the rather threatening attitude of England, intent upon a non-intervention policy on the part of Spain, the Madrid government, feeling that its prestige and the security of its African possessions were at stake, sent troops and supplies, first for a defensive campaign, and later for an occupation of the Riffian villages. Finally, the Spanish forces having increased to 24,000 men under Marshal Martinez-Campos, the Sultan recognized anew his liability for the losses incurred, and on March 5, 1894, pledged himself by treaty to pay Spain an indemnity of \$4,000,000 and to remove from the vicinity of the Spanish possessions the troublesome tribes. In June, 1894, Sultan Mulai-Hassan died suddenly, under rather suspicious circumstances, and his 15-year-old son, Mulai-abd-el-Azis, was proclaimed sultan in the Sherifian camp and the government was recognized by the powers before any part of the indemnity had been paid or any steps taken to collect it.

MOROCCO LEATHER. See LEATHER, Vol. XIV, p. 388.

MORPHOLOGY (in plants). The present article is intended to give a brief and popular outline of the morphology of the plant kingdom upon the basis of its evolution, and for fuller and more technical details refers to the articles on BOTANY, MORPHOLOGY, and REPRODUCTION.

Morphology considers not merely the form and structure of the mature plant-body and its organs, but also the development of these structures. This latter phase, often referred to as *embryogeny*, is essential to an understanding of the homologies, and is of fundamental service in phylogeny. As modifications of structure imply adaptation to function, it is impossible to consider morphology entirely apart from physiology.

The fundamental fact of morphology is the existence of a living substance, called *protoplast*,

which constitutes the real living body of every plant. This protoplasm may not develop any structure about itself, as in certain phases of the "slime-moulds"; but ordinarily it occurs in very small masses, separated from each other by membranes which the protoplasm has constructed, and which organize the plant-body into an aggregation of *cells*. The plasmic mass in each cell usually is not completely isolated from its fellows, but exceedingly delicate threads of protoplasm often pass through perforations of the cell-wall and bring into living connection neighboring plasmic masses. This is known as "continuity of protoplasm," and organizes the whole plant into a single living body. All plant-bodies originate from a single cell, which usually has a cell-wall. This single cell may represent the whole structure of the mature form, and there are many plants which are spoken of as "one-celled" (unicellular). The "many-celled" (multicellular) forms, however, are more common, and these, having begun as a single cell, by cell-division and cell-growth develop to the mature form and size. Multicellular plants, therefore, are aggregations of cells, which, in the lower plants, are but repetitions of each other, each cell being a duplicate of every other in form and power. Among higher plants, however, the cells do not all remain alike, but adapt their forms more specially to the various functions, so that different kinds of cell-aggregates appear, known as "tissues." This differentiation of tissues reaches its extreme expression in the highest plants, whose bodies are exceedingly complex, and are capable of performing a great variety of functions, in a far more perfect way than can those plants in which all the functions must be carried on by a single cell. In this specialization of cell-form and cell-work, however, some fundamental powers have been lost, notably the power of reproduction, which is confined to cells of more primitive form. The cell has thus come to be regarded as the morphological unit of the plant, and it is convenient to regard it as such at present, although subsequent researches may necessitate a change of statement. Since, in the largest sense, the whole work of the plant may be divided into *nutritive* and *reproductive*, the evolution of plants is concerned with two sets of organs, the nutritive or "vegetative organs," and the "organs of reproduction," the former constituting the plant-body, the latter including those specialized organs set apart for reproduction. In the following account, these two lines of evolution will be followed only in their main facts, all specially modified groups and structures being left to the regular text-books.

The *Thallophytes* represent the lowest of the four great groups of plants at present recognized. At the lowest limits of this group are to be found the simplest plants, and from the standpoint of evolution the most primitive forms. The great series of Algæ, or "sea-weeds," characterized by containing chlorophyll, shows the gradual modification of plant-structure from its simplest

phases to forms of great complexity. The evolution of the plant-body in Algæ may be outlined as follows: The lowest forms consist of a single spherical cell, which multiplies itself by cell-division, each individual being thus replaced by two new ones. In some cases this cell-multiplication results in cell-aggregates, arranged in a continuous row or filament, or in a plane, or in a mass, all held together by their more or less mucilaginous cell-walls. In this case, however, the multicellular form is a colony of independent, undifferentiated cells. In higher forms the multicellular filament, etc., shows more of an individual character and the beginning of differentiation. In a filament, for instance, the two ends may differ somewhat from each other; or the one may develop as a hold-fast, the other as the vegetative part of the plant-body, indicating the primitive division of the body into "root" and "shoot." These undifferentiated forms have the plant-body known as the "thallus," which gives name to the whole group. In many cases a filamentous body develops further complexity by branching, the branches simply repeating the structure of the main axis. Besides the filamentous forms there are those which are spherical and those which are flattened expansions, the latter being especially common among the true sea-weeds. Among the higher sea-weeds there is frequent a still greater differentiation of the plant-body, not only a distinction between root and shoot being apparent, but the shoot showing a complete differentiation of stem and leaf (*Sargassum*, etc.). In these cases the three primary vegetative organs—root, stem and leaf—are represented, and there is in addition a certain amount of cell-differentiation, but not decided enough to result in distinct tissues. Among the Algæ, therefore, plant-bodies begin with unicellular forms; include multicellular forms showing a differentiation into root, stem and leaf, but no marked tissue differentiation; and display every intermediate gradation of complexity. Even more striking among Algæ is the evolution of the reproductive organs. In the low unicellular forms, there are no special organs for reproduction, the multiplication of the species being secured by simple cell-division. In somewhat higher forms the beginning of specialized reproduction appears in the formation, by "internal cell-division," of certain specialized cells whose function is to reproduce the plant. These cells have received the general name *spore*. The spores escape from the cell which produces them (the "mother-cell"), and if the surrounding medium is water, as is generally the case among Algæ, they usually have the power of swimming by means of cilia. These motile spores, called "zoöspores," have the power of producing another plant like the parent. In the formation of spores the ordinary vegetative cells are utilized at first, but with further differentiation special cells are set apart for this work, called *sporangia* or "spore-cases." Besides reproduction by ordinary cell-division and by spores, the Algæ present still another kind of reproduction, known as the

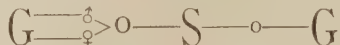
"sexual." The sexual method and the method by spores (non-sexual) usually co-exist in the same plant, but the sexual has evidently been derived from the non-sexual. The essential structures connected with sexual reproduction are the formation of two specialized cells, *gametes*, which are incapable of further development, but which unite to form a third cell, the *oöspore*, which has all the powers of reproduction which belong to the ordinary spore. It seems to be quite certain that gametes have developed from zoöspores. In fact, in such an alga as *Ulothrix*, zoöspores of different sizes are formed, the larger ones capable of reproduction, the smaller ones often incapable, but upon coalescence in pairs the resultant cell can reproduce. These reduced zoöspores are gametes, and their union is a sexual act; and the *Ulothrix* represents plants in which the two methods of reproduction, sexual (by gametes) and non-sexual (by spores), are beginning to differentiate. In these primitive stages of sexual reproduction the two gametes show no differences in form or size or activity; but with the increasing differentiation of plants they gradually come to be more and more unlike, one increasing in size and gradually becoming passive, the other diminishing in size but increasing in activity. When the gametes have thus become distinct from each other, the large passive one is called the *oösphere*, and the smaller, active one the *spermatozoid* or *antherozoid*, otherwise the female and male cells. At their first appearance, gametes are not only alike in appearance and action, but their "mother-cells" are the ordinary vegetative cells of the plant. Later, special cells are set apart to produce them, and when the gametes have become sexually differentiated these special cells, the sex-organs, are known as the *oögonium* (producing the oösphere) and the *antheridium* (producing spermatozoids). For convenience, the coalescence of similar gametes is called *conjugation*, and the resultant reproductive cell a *zygospore*; while the union of oösphere and spermatozoid is called *fertilization*, and the resultant cell an *oöspore*. The life-history of an ordinary alga, therefore, is as follows: A vegetative body of similar cells begins to produce spores, each of which develops another vegetative body; this non-sexual reproduction continues for a certain time, resulting in an extensive multiplication of the plant; later (usually toward the close of the growing season) gametes are developed, which by their union form oöspores; the oöspores usually have a heavy protective coat and persist until the next growing season, in the meantime all the vegetative plants perishing; at the beginning of the next growing season the oöspores germinate and develop new plants, which, beginning to reproduce by ordinary spores, rapidly multiply again.

Besides the Algæ, the Thallophytes contain the great parallel group of Fungi, plants which contain no chlorophyll and hence must live as parasites or saprophytes. The Fungi also begin with one-celled forms, such as bacteria, and include forms of considerable complexity, such as mush-

rooms. In many of their forms they so closely resemble Algæ that they are regarded as having been derived from them, although among the higher fungi such a relationship is by no means evident. Originally chlorophyll-bearing and independent, their parasitic or saprophytic habit has entailed modifications of structure in the higher forms, having led often to a complete disappearance of sexual organs. From the standpoint of the evolution of the groups above Thallophytes, the Fungi are of no importance, the line of advance being through the Algæ. As degenerate and often highly modified Algæ, therefore, the Fungi may be dismissed from the present discussion with this brief mention; although from the economic standpoint, as prolific sources of plant and animal diseases, as active in many important processes, they are of very great importance.

In the second great group of plants, the *Bryophytes* (liverworts and mosses), a more complex morphology is met. The important phenomenon known as "alternation of generations" here becomes plainly exemplified, having been indicated to some extent among the higher Algæ. It represents a more distinct separation of the sexual and non-sexual work of the plant. In Algæ the same plant produces spores and gametes, but in Bryophytes the plant which bears gametes has lost the power of producing spores, a condition which has been brought about by the development of a new structure. The oöspore, formed by the coalescence of gametes, does not produce a plant like the one from which it came, as is the rule among Algæ, but develops a very different and quite independent structure. This new structure, in turn, produces spores, each of which, upon germination, develops the original gamete-bearing plant. Thus two phases or generations alternate with each other, mutually producing each other, but not, except occasionally, reproducing themselves. The phase producing gametes is called the *gametophyte*; that producing spores, the *sporophyte*. Among the Bryophytes the gametophyte does the chief vegetative work of the plant, and therefore is the more conspicuous phase, being commonly spoken of as "the plant"; while the sporophyte is represented by the complex "spore-case" and its usually elongated stalk, the whole structure being often called "the fruit" of the moss, although morphologically it holds no relation to the fruit of higher plants. The gametophyte of Bryophytes presents a peculiarity of structure in that it consists of two very dissimilar parts. The spore upon germinating first develops a branching structure, which is usually filamentous and alga-like, known as the *protonema*, and as lateral buds on this protonema the adult shoots or leafy moss-plants arise. The gametophyte, therefore, is made up of protonema and adult shoots. The life-history of a Bryophyte is as follows: The gametophyte, with the vegetative structure just described, develops sexual organs, *antheridium* and *archegonium* the latter being a many-celled, flask-shaped organ, whose more or less elongated neck develops a passage-way for

the spermatozoids to reach the oösphere; the oöspore, formed by the coalescence of spermatozoid with oösphere, develops the sporophyte, a structure consisting of a spore-case and its stalk, but developing no vegetative organs; the spores developed by the sporophyte upon germination produce the gametophyte. The life-history formula is written as follows:

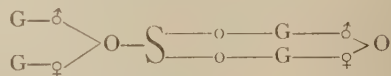


in which G stands for gametophyte, δ and ♀ for male and female gametes, O for oöspore, S for sporophyte and o for spore.

Not only does the plant-body of Bryophytes show a distinct differentiation of the vegetative organs (root, stem and leaf), but the stems of both sporophyte and gametophyte display a distinct differentiation of tissues. A cross-section of the stem shows an outer region of thick-walled cells, which give a certain amount of rigidity, representing the tissue known as *sclerenchyma*; within is a zone of primitive thin-walled cells, known as *parenchyma*; while in the center there often occurs an axial strand of small and elongated parenchyma cells, set apart as conducting tissue, and in higher plants to differentiate completely into the important tissues of the vascular region. The leaves of Bryophytes are very simple, consisting of a single lamina of cells; while the roots of the gametophyte are simply hair-like organs called *rhizoids*. The sporophyte develops a root-structure, called the *foot*, which is thrust into the gametophyte as a hold-fast and organ of absorption. In reference to phylogeny, the liverworts (*Hepaticæ*) seem to have been derived from the Algæ, and to have given rise to the Pteridophytes above, while the mosses (*Musci*) have arisen from them as a specialized and divergent branch.

The *Pteridophytes* (ferns, horse-tails, club-mosses) form the third great division of plants, and, while associated with the Bryophytes in certain important characters, show decided advances. The alternation of generations is still more marked in the true ferns, for the gametophyte and sporophyte phases are not only distinct but independent plants. A notable change, however, is seen in the transference of the chief vegetative work to the sporophyte, which in Bryophytes was done by the gametophyte. In the Pteridophytes, therefore, "the plant," that is, the prominent leafy phase, is the sporophyte. Instead of developing elaborate capsules, as in mosses, the fern sporophyte develops numerous sporangia usually upon the under surface of its leaves. The gametophyte is usually a small, flat, thallus body, called the *prothallium*, sometimes containing chlorophyll, sometimes entirely subterranean. The prothallium bears antheridia (containing spermatozoids) and archegonia (containing an oösphere), and from the fertilized oösphere (oöspore) the leafy sporophyte arises, the spores developed on the sporophyte leaves in turn producing prothallia (gametophytes). While the vegetative body of the gametophyte is simple and primitive, the sporophyte presents a high degree

of differentiation in all the vegetative organs. The elaboration of the *vascular* or woody system makes possible a much more complex development of these organs. While this system provides for extensive conduction, the rigidity necessary for plants which sometimes become trees is mainly supplied by a very large development of sclerenchyma. The vascular system is differentiated into fibrous, tracheary and sieve tissues, while the sclerenchyma and primitive parenchyma continue. The most significant morphological fact connected with Pteridophytes, however, is the appearance of *heterospory*, associated with a great reduction of the gametophyte. In the genera *Isoetes*, *Salvinia*, *Azolla*, *Marsilea*, *Pilularia* (belonging to ferns) and *Selaginella* (belonging to club-mosses) heterospory is distinctly presented. It signifies that the sporophyte produces two kinds of spores, different in size, hence called *macrospores* and *microspores*, the former developing a prothallium (gametophyte) which bears archegonia, the latter a prothallium which bears antheridia. Thus the gametophytes are sexually differentiated, and this differentiation extends to the spores which produce them. With the appearance of these differentiated spores the gametophytes are reduced in size, and finally do not leave the spores which develop them, although more or less exposed or extruded through the rupturing or dehiscence of the spore-walls. The life-history formula of a heterosporous Pteridophyte is as follows:



The fourth and highest group of plants is made up by the *Spermatophytes* (often written *Spermatophytes*), also known as the Phanerogams or flowering plants. In this group the vegetative organs and the tissue systems become still more elaborated, and an exceedingly complex and diverse nutritive mechanism is shown. Alternation of generations is also present, but it is disguised very much by the great reduction of the gametophyte, which is no longer independent, but lives as a parasite upon the highly organized sporophyte. Heterospory, also, is universal, and the concealment of the gametophyte has led to the long current conclusion that the macrospores and microspores are sexual cells, and the organs which produce them (stamens and pistils) are sexual organs. The terminology of the flowering-plants is full of this idea, such terms as "male" and "female flowers," "hermaphrodite flowers," "monœcious," "diœcious" and "polygamous" plants, etc., all implying this erroneous notion of sex. The whole visible plant is a sporophyte. The stamens and pistils (better, "carpels") are leaves modified to produce microsporangia and macrosporangia, homologous with the sporangia borne on the leaves of ferns. The cluster of microsporangia (usually four in number) forms the anther; while the contained pollen-grains are microspores. The carpels (making up the pistil)

are leaves modified to bear the macrosporangia, which have received the name *ovules*. In these macrosporangia usually but one macrospore develops, called "embryo-sac" in the older terminology of flowering-plants. The microspore (pollen-grain) germinates, forming a structure of two or more cells, which represents the male gametophyte. One of the cells of this gametophyte develops a remarkable organ known as the "pollen-tube," which carries the male gamete to the female gamete. The development of this tube is one of the notable features of flowering-plants. In the Bryophytes and Pteridophytes the male gamete is an active spermatozoid, swimming to the female gamete through a watery medium. In flowering-plants, however, the watery medium is lacking; the gamete is no longer a spermatozoid, but is carried and guided to the oosphere by a special tube. The macrospore (embryo-sac) is peculiar in the fact that it is not "shed" by the sporangium which produces it, but is permanently retained. In this position it germinates, producing within itself a group of seven or more cells, which represent the female gametophyte. At least three of these cells are female sex-cells; but only one of them is capable of fertilization, and hence is called the oosphere. Upon fertilization by the male gamete brought by the pollen-tube, the oosphere becomes the oospore, which then develops the embryo of the new sporophyte. The great morphological feature of Spermatophytes, as the name implies, is the production of the structure known as the "seed." This is made possible by the retention of the macrospore in the sporangium (ovule) which produced it; and by the further retention of the female gametophyte and the consequent formation of the sporophyte embryo within the macrospore. Consequently, the morphology of the seed is very complex. It consists of (1) portions of the old sporophyte, represented by the outer parts of the seed, (2) the gametophyte, represented by the "endosperm," formerly called the "albumen," and (3) the embryo of the new sporophyte. The development of the "flower," also somewhat characteristic of the group, follows from the same chain of causes. In order to make possible the transfer of the male to the female gamete by the development of a tube by the male gametophyte, the microspore (pollen-grain) which produces the male gametophyte is transferred from its sporangium to the leaf (carpel) in connection with which the female gamete is developed. This transfer of the pollen has led to the great problem of pollination, worked out elaborately and variously by the flowering-plants, in the modification and grouping of other specialized leaves, especially in the way of fragrance, "irregularity," etc., in relation to insects as agents of the transfer, all combining to render the "flower" endlessly diverse.

The description of Spermatophytes given above applies more strictly to the Angiosperms. The Gymnosperms (pines and their allies) are intermediate in almost every particular between the

Angiosperms and Pteridophytes, developing a many-celled female gametophyte with numerous archegonia, having the macrosporangia (ovules) exposed, and the pollen-grains brought in direct contact with them, and a consequent small development of pollen-tube. In the Cycads the resemblance to Pteridophytes is still more striking. So far as the phylogeny of Spermatophytes is concerned, they seem to have descended from the heterosporous Pteridophytes, with probably the ancestral forms represented in the flora of to-day most nearly by such a group as Isoetes.

In brief summary, the salient facts in the morphological development of the plant kingdom are: Sexless plants, the evolution of sex from the sexless spores, the evolution of bisexuality, the alternation of generations, the sporophyte differentiating from the gametophyte, the appearance of heterospory, the gradual reduction of the gametophyte, the retention of the macrospore and consequent development of the seed.

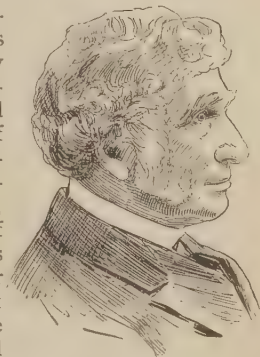
JOHN M. COULTER.

MORPHOLOGY OF BACTERIA. See BACTERIOLOGY, in these Supplements.

MORPHY, PAUL CHARLES, an American chess-player; born in New Orleans, Louisiana, June 22, 1837; graduated at St. Joseph's College, Spring Hill, Alabama, in 1824; studied law and was admitted to the New Orleans bar in 1858. After his great career as a chess-player (see CHESS, Vol. V, p. 602) he settled down to the practice of the law about 1859; but his intellect gradually gave way, and he never recovered its vigorous use, though he did not die until July 10, 1884. He died in New Orleans.

MORRILL, JUSTIN SMITH, an American statesman; born in Orange County, Vermont, April 14, 1810; received only a common-school education; engaged in business at an early age, but finally devoted himself to agricultural pursuits; served in the national House of Representatives, as a Republican, from December, 1855, to March 3, 1867, being chairman of the Committee of Ways and Means, and the author of the tariff bill of 1861 known by his name. He was elected United States Senator in 1867, and was re-elected for six successive terms, his Congressional service exceeding that of any living colleague. He wrote *Self-Consciousness of Noted Persons* (1886).

MORRILL, LOT MYRICK, an American statesman; born at Belgrade, Maine, May 3, 1813. He was admitted to the bar in 1839, having only received a partial college education; in 1854 he was elected to the state legislature, as a Democrat; subsequently entered the state senate, of which



JUSTIN S. MORRILL.

he became president (1856). A year later, having broken with the Democratic party on the Kansas question, he was elected governor by the Republicans. He was twice re-elected, and in 1861 succeeded Hannibal Hamlin in the United States Senate. Re-elected in 1863, he served until 1869, but was then defeated in caucus; served a part of William Pitt Fessenden's term (1869-71), and again was elected Senator in 1871. In June, 1876, under President Grant, he became Secretary of the Treasury, succeeding Benjamin H. Brewster, and held that office until March, 1877. He was an earnest advocate of a prompt resumption of specie payments. President Hayes appointed him collector of customs for the district of Portland, Maine, which office he held until his death, in Augusta, Maine, Jan. 10, 1883.

MORRILTON, a city and the capital of Conway County, Arkansas, located northwest of the central portion of the state, on the Arkansas River, and on the St. Louis, Iron Mountain and Southern railroad, 50 miles N.W. of Little Rock. Its manufactories include lumber, glass and furniture; it also has cotton-mills. Population 1890, 1,644.

MORRIS, a city, the capital of Grundy County, Illinois, situated in the northeastern part of the state, on the Illinois River, and on the Chicago, Rock Island and Pacific railroad, 21 miles S.W. of Joliet and 61 miles S.W. of Chicago; has a paper and car-wheel factory, brick and tile works, fire-proofing material, planing-mills; is one of the largest grain markets in the West, and has extensive mines of bituminous coal in operation. It also possesses a normal school, scientific school, and two national banks with a combined capital of \$125,000. Population 1890, 3,653; 1892, 4,991.

MORRIS, a post village, railroad junction and the capital of Stevens County, Minnesota, in the western part of the state, on Pomme de Terre River, 159 miles N.W. of St. Paul, on the Great Northern and the Northern Pacific railroads; is a very good farming section, and has several small lakes in its vicinity, which afford good fishing. Population 1890, 1,266; 1895, 1,417.

MORRIS, CLARA, an American actress; born in Cleveland, Ohio, about 1846. To assist her widowed mother, she figured, at fifteen, as a ballet-girl of the Cleveland stage. Under excellent tuition she rose rapidly in the profession, until in 1869 she was leading lady at Wood's Theater, Cincinnati. In 1870 she played at Daly's Theater, in New York City, as a stock actress, at first in small parts, until she made her first prominent success as Anne Sylvester in *Man and Wife*, afterward appearing in the plays of *Divorce*, *Camille*, *Article 47*, *Miss Multon* and *The New Magdalen* with considerable success. Her various tours through the states were highly successful. Ill health compelled her frequently to withdraw from the stage for months at a time. At the height of her career she was considered one of the most powerful of American-born "emotional" actresses.

MORRIS, GEORGE POPE, an American journalist; born in Philadelphia, Oct. 10, 1802. He

served his apprenticeship on the *New York Gazette* and the *American*; he founded the *New York Mirror*, and afterward the *Home Journal*, with both of which N. P. Willis was associated. He was for a time brigadier-general of the New York militia. He wrote a number of poems, which found a ready sale, both separate and in book-form. Among his best-known poems are *Woodman, Spare That Tree*; *We Were Boys Together*; *My Mother's Bible*; *Long Time Ago*; and *Whip-poor-will*. He died in New York City, July 6, 1864.

MORRIS, GEORGE SYLVESTER, an American educator and author; born in Norwich, Vermont, Nov. 15, 1840; graduated at Dartmouth in 1861; served one year in the Union army, and spent 1866-68 at the Universities of Halle and Berlin, Germany. From 1870 to 1880 he occupied the chair of modern languages at Ann Arbor, after which he was appointed professor of philosophy in the same university. From 1878 to 1885 he lectured at Johns Hopkins University on *Ethics* and the *History of Philosophy*; translated Ulberweg's *History of Philosophy* (2 vols., 1872-74); and wrote *British Thought and Thinkers* (1880); *Kant's Critique of Pure Reason: An Exposition* (1882); and *Hegel's Philosophy of the State* (1887).

MORRIS, GOUVERNEUR, an American statesman, and the half-brother of LEWIS MORRIS, the signer of the Declaration of Independence; born in Morrisania, New York, Jan. 31, 1752; graduated at King's (now Columbia) College in 1768; admitted to the bar in 1771; sent to the first provincial congress, he strenuously opposed the issuing of paper money, except under certain conservative conditions. He entered the Continental Congress in 1777, giving constant and enlightened attention to financial questions. From 1781 to 1784 he was assistant to Robert Morris, superintendent of the national finance. In 1787 he took his seat as a delegate in the convention that framed the United States constitution. The greater part of the year 1791 he spent in England, as a confidential agent of Washington, and next served till August, 1794, as United States minister to France. Returning to America in 1798, he sat for New York in the United States Senate from 1800 to 1803, and was chairman of the New York canal commissioners from 1810 till his death, Nov. 6, 1816. He was a man of eloquence and poetical genius, and of lofty feelings, both in his public and private life.

MORRIS, JOHN GOTTLIEB, an American clergyman, educator and writer; born at York, Pennsylvania, in 1803; graduated at Dickinson College in 1823; studied theology at Princeton and Gettysburg; licensed to preach in 1827; founded the Trinity English Lutheran Church, Baltimore, Maryland, and became its minister (1827-60); pastor of the Third English Lutheran Church, Baltimore, and finally in charge of the church of the same denomination at Lutherville, Maryland, a village founded by his efforts, and in which he located his Young Ladies' Seminary. He lectured on natural history in various colleges and at the

Smithsonian Institution. Devoted himself especially to entomology and microscopy; has been chairman of the entomological section of the American Association for the Advancement of Science. He founded *The Lutheran Observer* in 1831. Wrote *The Catechumen and Communicant's Companion* (1831); *Popular Exposition of the Gospels* (2 vols., 1840); *Quaint Sayings and Doings Concerning Luther* (1859); *The Lords Baltimore* (1874); *Augsburg Confession and the Thirty-nine Articles* (1879); in the scientific line, *Catalogue of the Lepidoptera of North America* (1860); besides a number of important translations from the German, and books of religious discussion. He was prominently connected with many scientific and other societies. He died in Lutherville, Maryland, Oct. 10, 1895.

MORRIS, LEWIS, an American patriot, one of the signers of the Declaration of Independence; born at Morrisania, New York, in 1726; the son of Chief Justice Lewis Morris, of the admiralty court of New York; graduated at Yale (1746). He assumed a bold position toward the English authorities in New York City, and was sent by the patriots of his colony to Congress in 1775. The following winter he worked actively to detach the western Indians from their British allies. Returning to New York in 1776, he infused new energy into the civic resistance to English oppression. On the 4th of July he signed the Declaration of Independence, and was punished for it by the destruction of his extensive property on the Hudson. He relinquished his seat in favor of his half-brother, Gouverneur (q.v.), in 1778, and returned to the care of his estate, where he died, Jan. 22, 1798.

MORRIS, SIR LEWIS, an English poet, was born in January, 1833, in Caermarthen, Wales, and educated at Sherborne School and Jesus College, Oxford, where he graduated in 1855, first class in classics and chancellor's prizeman. In 1858 he was called to the bar, and practiced chiefly as a conveyancing counsel until 1881, when he accepted the honorary secretaryship of the University College of Wales, and afterward became treasurer. He was as an active and ardent Gladstonian, and acted for a time as vice-chairman of the political committee of the Reform Club. He also served, in 1880, on the departmental committee charged by the government to inquire into intermediate and higher education in Wales. He was better known as an extensive contributor to the poetical literature of the time. In 1871-75 he published three series of *Songs of Two Worlds*, since collected in a twenty-fifth edition. These were followed in 1876-77 by a still more popular work (39th ed.), *The Epic of Hades*, "a lurid drama, in verse, of the unseen world and the punishment and purgation of spirits," and in 1878 by a drama in monologue entitled *Gwen*. After these the poet published *The Ode of Life* (1880); *Songs Unsung* (1883); *Gycia*, a tragedy written for the stage (1886); and *Songs of Britain* embodying several Welsh legends, and with which is included the *Ode on the Queen's Jubilee*, written by

request, owing to the illness of the Laureate, Tennyson (1887). In acknowledgment of the latter, Morris received from her Majesty the jubilee medal, and in 1895 was knighted. In 1890 a volume of the poet's collected works appeared, together with *A Vision of Saints*, which, "proceeding after the manner of Dante, attempts for the Christian ideal what *The Epic of Hades* did for the pagan world." His later writings embrace *Songs Without Notes* (1894), and odes on the death of the Duke of Clarence, on the opening of the Imperial Institute, London, and on the marriage, in 1893, of the Duke of York with the Princess Mary of Teck.

MORRIS, PHILIP RICHARD, an English painter; born at Devonport, England, Dec. 4, 1838. While working in his father's foundry he gave his spare time to the study of painting, and finally entered the schools of the Royal Academy, London, where, in 1858, he was awarded a gold medal for his *Good Samaritan* and obtained a traveling studentship; studied in France and Italy; elected an associate Royal Academician in 1877. Among his leading canvases are *The Shepherd of Jerusalem*; *The Mowers*; *The Sailor's Wedding*; *The Fête-Dieu in Dieppe*; *Sons of the Brave*; and many excellent portraits.

MORRIS, RICHARD, an English philologist; born at Bermondsey, England, Sept. 8, 1833. He graduated from the Battersea Training College, and entered the Church of England in 1871. From 1875 to 1891 he was head master of the Royal Masonic Institution for Boys. He was an active member of the Chaucer and the early English societies, president of the Philological Society in 1874, and a thorough student of Pāli, the sacred language of Buddhism. He wrote *The Etymology of Local Names* (1857); *Specimens of Early English—A.D. 1250-1400* (1866-72); *Historical Outlines of English Accidence* (1872); *On the Survival of Early English Words* (1876); *Report on Pāli Literature* (1880); and *Folk-Tales of India* (1884-85). He died at Harrold Wood, May 12, 1894.

MORRIS, WILLIAM, an English poet and art-worker, was born March 24, 1834, at Walthamstow, near London, and died at Kelmscott House, Hammersmith, Middlesex, Oct. 3, 1896. He was educated at Marlborough College and at Exeter College, Oxford, where he graduated in 1856. For a time he studied painting and turned his attention to architecture, but afterward devoted himself to literature, varied by an active career in the manufacture art-fabrics, wall-papers and stained glass. In the latter enterprise he was joined by his artist-friends, Dante G. Rossetti, Burne-Jones and Ford Madox Brown, who held with him that not only "executive handicraft was within the province of an artist, but that all crafts demanded artistic treatment." In the



WILLIAM MORRIS.

factory at Surrey, Morris worked as a designer of house-decorations, which proved not only a profitable undertaking, but contributed to reform public taste in color and design. In later life, the poet also took a keen interest and manifested a lively enthusiasm in the Kelmscott Press, near by his home, from which he issued a series of artistic reprints of early English authors, made attractive, mechanically, by his exquisite taste. Morris's literary career began in 1856 with the publication of *The Defence of Guinevere, and Other Poems*, a series of lyrics, mediæval as to matter, tone and color, which have since appealed with increasing delight to readers of imaginative tastes. This was followed in 1867 by a long narrative poem, entitled *The Life and Death of Jason*, and in 1868-70 by *The Earthly Paradise*, a collection of classical and mediæval stories in verse, having much the same sort of setting as the *Canterbury Tales* of Chaucer. His treatment, in *The Earthly Paradise*, of legendary tales, which he represents as recited by Norwegian mariners while they sail westward in quest of the earthly paradise, confirmed their author's rank as a poet, though their dreamy, melancholy mood seems alien to the breeziness and active vigor of the old Vikings. His later verse includes *Love is Enough; or, the Freeing of Pharamond* (1873); *The Story of Sigurd the Volsung; The Fall of the Niblungs* (1876); and translations into English verse of Virgil's *Æneid* and Homer's *Odyssey*. Besides this varied work, together with some prose translations from the Icelandic, and a rendering of the Anglo-Saxon epic of *Beowulf*, Mr. Morris published in 1882 a number of lectures on art topics, the chief of which is *Hopes and Fears for Art*, and also a collection of essays on socialism, of which he was a propagandist, entitled *Signs of Change* (1888). His recent writings include *Poems by the Way* (1892); *The Well at the World's End* (1896); and some translations of Icelandic Sagas, undertaken in collaboration with Eiríkr Magnússon, and two prose romances, steeped, if the term may be allowed, in the poetry of socialism, *News from Nowhere* and *A Dream of John Ball*. Happily, his verse is untainted by his later economic opinions and socialistic doctrines, and remains to translate the reader of it from the hard, material world about him to "the beautiful garden of dreams."

G. MERCER ADAM.

MORRISBURG, a town of Ontario, a port of entry, situated on the St. Lawrence River, and on the Grand Trunk railroad, 92 miles W. of Montreal; it does an extensive shipping business, and has well-improved water-power; has saw, grist and carding mills, two foundries and a tannery. A steamer runs regularly between here and Waddington, New York. Population 1891, 1,859.

MORRIS ISLAND, a low, narrow, sandy island on the south side of the entrance to Charleston harbor, South Carolina, 3½ miles long, utilized by the Confederate forces at an early period during the Civil War as part of the exterior line of defenses of Charleston. In 1863 the southern end of the island was captured by the Union forces, the memorable siege of Fort Wayne, at its northern extremity, re-

sulting in complete possession of the island by the Federal troops.

MORRISON, a city and the capital of Whiteside County, Illinois, 127 miles W. of Chicago, on the Chicago and North-Western railroad, and 14 miles E. of Clinton, Iowa. It contains a courthouse, library and museum, and a national bank with a capital of \$100,000. It is in an agricultural, dairying and stock-raising district. Population 1890, 2,088.

MORRISON, WILLIAM RALLS, an American legislator; born in Monroe County, Illinois, Sept. 14, 1825; graduated at McKendree College; served as a private in the Mexican War, and subsequently entered the legal profession. He was elected to the Illinois legislature three successive times, being speaker in 1859; at the beginning of the Civil War he organized the Forty-ninth Illinois Regiment and was wounded at Fort Donelson. While still in the field he was elected to Congress as a Democrat. He served from 1863 to 1865, and again from 1873 to 1887. During 1873-75 he was chairman of the Committee of Ways and Means, and in 1885 he introduced a tariff reform bill, which was defeated. In 1887 he was appointed by President Cleveland a member of the Interstate Commerce Commission.



WILLIAM R. MORRISON.

MORRISTOWN, a city and the capital of Morris County, in northern central New Jersey, 30 miles W. of New York City, on the Delaware, Lackawanna and Western, the Rockaway Valley and the Whippany River railroads. It is about 500 feet above the level of the sea, and is the home of many New York business men; it has a public square in which has been erected a handsome granite monument to the soldiers who died in the Civil War. It possesses historical interest, as having been twice the headquarters of the Continental army during the Revolutionary War. The Ford mansion, occupied by General Washington, is still standing, and has been purchased by the State Historical Society. Among the public buildings, the most worthy of mention are the Courthouse, the Orphans' Home and the State Asylum for the Insane. The latter, four miles from the city, at Morris Plains, is one of the finest structures of its kind in the country, having cost over \$2,500,000, and accommodates one thousand patients; the building is 1,200 feet in length (including the wings), and the grounds comprise four hundred acres. The city has two graded public schools, two parochial schools, St. Elizabeth's Convent, two seminaries for young ladies, a classical school for boys, a public library containing over ten thousand volumes, two hospitals, and two national banks with a combined capital of \$300,000. It is an important shipping-center for mining products. Population 1890, 8,156; 1895, 10,290.

MORRISTOWN, a post village, a railroad junction and the capital of Hamblen County, Tennessee;

in the northeastern portion of the state, 42 miles N.E. of Knoxville, on the Morristown and Cumberland Gap and the Southern railroads; has a stove factory, machine-works, carriage and tobacco factories, steam-mills, medicine-works and extensive marble-yards. The town contains two colleges. Population 1890, 1,990.

MORSE, EDWARD SYLVESTER, an American naturalist; born in Portland, Maine, June 18, 1838; graduated at the Lawrence Scientific School, Harvard, and attracted the attention of Louis Agassiz. He made a specialty of the study of brachiopods, which he was the first to classify as worms, and not mollusks. He founded the *American Naturalist*, published in Salem, Massachusetts, and helped organize the Peabody Academy of Science of that city. He was appointed professor of zoölogy in Bowdoin College in 1871, and remained there till 1874. In 1877 he visited Japan, accepted the chair of zoölogy at the Tokyo University, and organized the Imperial Museum of Natural History. In 1880 he returned to Salem with the finest collection of Japanese pottery ever gathered. He was president of the American Association for the Advancement of Science from 1885 to 1887. Among his numerous publications are *Embryology of Terebratulina* (1872); *Systematic Position of the Brachiopods* (1873); *First Book in Zoölogy* (1875; translated into German and Japanese); *Shell-Mounds of Omori* (1879); *Early Race of Man in Japan* (1879); *Japanese Homes and their Surroundings* (1886).

MORSE, JOHN TORREY, an American author; born Jan. 9, 1840, in Boston, Mass.; graduated at Harvard, 1860; lecturer on history there, 1876-79; with Henry Cabot Lodge edited the *International Review*; published *Treatise on Law Relating to Banks and Banking* (1870); *Law of Arbitration and Award* (1872); *Famous Trials* (1874); *Life of Oliver Wendell Holmes* (1895); and edited the volumes on Hamilton, John Quincy Adams, Thomas Jefferson, John Adams, Franklin, and Lincoln, in the American Statesmen Series.

MORSE, SIDNEY EDWARDS, an American journalist, and a brother of Samuel F. B. Morse, the electrician; born in Charlestown, Massachusetts, Feb. 7, 1794; graduated at Yale in 1811, and studied successively theology and law. He founded and edited the Boston *Observer*, a religious weekly. He then assisted his brother Samuel in obtaining a patent for a flexible piston. Removing to New York City he founded, with his brother Richard, in 1823, the New York *Observer*, which he edited until 1858. Interesting himself in the production of maps in colors, he invented the "cerographic method" of printing in colors on ordinary typographic presses, and later he patented a "cathometer" for deep-sea soundings. He died in New York City, Dec. 24, 1871.

MORTIFICATION OR GANGRENE. See SURGERY, Vol. XXII, p. 683.

MORTISING-MACHINE. The mortising of woodwork, as in framing timbers, making doors, sashes, etc., is accomplished almost wholly by power-machines, the prevailing type having an upright metal framework, and bearing at the top a wheel-crank that reciprocates the chisel. The work is

mounted on an adjustable table two or three feet from the floor, and a treadle serves to bring it within reach of the reciprocating chisel. Boring-attachments often are added; also, compound tables, with rack and pinion feed. Reversible chisels are used, and frictional belts, that slip in case any unusual strain is encountered. The chain-mortiser, introduced about 1891, makes use of an endless chain, formed of small cutters. This will cut closer to the edge of wood without splitting than any other mortiser. Its operation is also very much faster for many classes of work. The cutters follow each other with such rapidity, each taking away a very small portion of wood, that the action is more like that of a file or milling-cutter than of a chisel. This machine is coming rapidly into increased use.

MORTON, HENRY, an American physicist and chemist; born in New York City, Dec. 11, 1836; graduated at the University of Pennsylvania in 1857, and then studied law while pursuing chemical researches and lecturing on physics and chemistry at the Episcopal Academy, Philadelphia. While professor of chemistry at the Philadelphia Dental College in 1863, his lecture on light at the Philadelphia Academy of Music (April, 1864) met with great success in book-form, both in America and Europe; appointed professor of chemistry at the University of Pennsylvania in 1869; president of the Stevens Institute of Technology, Hoboken, New Jersey in 1870. He published a large number of papers and monographs on scientific subjects.

MORTON, J. STERLING, an American statesman; born in New York, April 22, 1832, of Scottish ancestry; graduated at Ann Arbor, and later at the Union College of Law, New York City; did newspaper-work in Detroit, Michigan, Chicago, and finally in Bellevue, Nebraska. In 1855 he was elected to the Nebraska territorial legislature. In 1858 he was secretary of the territory, and became acting governor on the resignation of Governor Richardson. He was appointed Secretary of Agriculture by President Cleveland in March, 1893. He wrote the article on AGRICULTURE in these Supplements.

MORTON, LEVI PARSONS, an American statesman and financier; born at Shoreham, Vermont, May 16, 1824. He was first a country storekeeper's assistant; then partner in the Boston firm of Beebe, Morgan and Cory; then in the New York City firm of Morton and Grinnell, dry-goods merchants (1854); in 1863 founded the banking-houses of Morton, Bliss and Company in New York, and of Morton, Rose and Company in London.

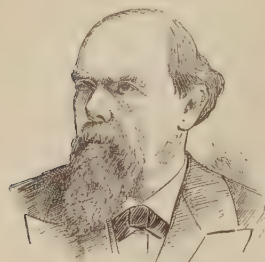
These firms were fiscal agents of the United States government from 1873 to 1884, and were intrusted with the collection and payment of the Geneva and Halifax fisheries awards. In 1878 and 1880 he was returned to Congress as a Republican; from 1881 to



LEVI P. MORTON.

1885 he was minister to France; in 1888 he was elected Vice-President of the United States, and in 1894 governor of the state of New York.

MORTON, OLIVER PERRY, an American statesman; born in Wayne County, Indiana, Aug. 4, 1823.



OLIVER P. MORTON.

At 15 he was apprenticed as a hatter, and saved enough money in four years to pay for a college education at Miami University; studied law at Centerville, and began practicing in 1847; circuit judge in 1852; took an active part in the anti-slavery propaganda, and helped found the Republican party. Defeated for the governorship of Indiana (1856), he was elected lieutenant-governor in 1860, with the understanding that Henry S. Lane, the governor, was to be sent to the United States Senate. This arrangement was carried out, and Morton filled the office of governor throughout the Civil War. He was successful in raising troops for the support of the Union, and bold almost to recklessness in his means of action. He believed that his political opponents in the state were determined to support the Confederacy by refusing to supply any more troops to the Federal government, and the meeting of a hostile legislature in 1863 brought matters to a head. The Republicans abandoned the legislature, thus leaving their opponents without a quorum; the governor ordered money for war expenses to be borrowed on the credit of the state; the Democratic attorney-general and the state supreme court held that this was illegal, but the indomitable governor borrowed the money on his personal responsibility, and managed the state government without a legislature. Subsequently the state assumed the obligations which he incurred, and in 1864 elected him governor. In 1866 he was elected to the United States Senate, and remained there till his death, Nov. 1, 1877, taking a prominent part in every debate, being active in the impeachment proceedings against President Johnson, and exercising a strong influence on the party policy.

MORULA. See ANIMAL KINGDOM, Vol. II, p. 51.

MOSASAURIA. See REPTILES, Vol. XX, pp.

444, 445.

MOSBY, JOHN SINGLETON, an American guerrilla; born in Powhatan County, Virginia; studied at the University of Virginia, but failed to complete his course, as he shot a student who assaulted him; was admitted to the bar and practiced law at Washington, Virginia; enlisted in the Confederate cavalry in 1861, and served first under General Joseph E. Johnston. In 1862, General James E. B. Stuart discovered his aptitude as a scout, and, giving him a force of volunteers, authorized him to begin those raids in the enemy's country which made him so notorious. Later, Mosby recruited his men himself, and often accepted deserters from both the Union and Confederate armies. His movements were so rapid and fearless, and his men so despe-

rate, that he managed to extricate his command from the most reckless adventures. He rose to be a full colonel, and his command was assimilated to the regular cavalry. At the conclusion of the war, General Grant insisted that Mosby and his guerrillas should be considered as belligerents, and not as freebooters. Mosby was always grateful for this to the great Union commander, and when he had settled as a lawyer in Warrenton, Virginia, his gratitude inspired him to join the Republican party. Later, President Hayes appointed him United States consul to Hongkong, where he rendered important services. He was removed by President Cleveland, and made his home in San Francisco, California. He wrote a number of articles for periodicals, and *War Reminiscences* (1887).

MOSCOW, a town and the capital of Latah County, Idaho, on the Northern Pacific and Union Pacific railroads. It is quite near the Washington boundary line, and 94 miles S. by E. of Spokane, Washington. It is in a mining, stock-raising and agricultural region. It is the seat of the University of Idaho, a non-sectarian institution founded in 1892, in 1896 having 15 instructors, 225 students and a library of 3,000 volumes. The town has two national banks with a combined capital of \$175,000, two state banks, and a large lumber trade. Population 1890, 2,861.

MOSELEY, HENRY, an English educator; born in England, about 1802. Graduated at St. John's College, Cambridge (1826); received holy orders (1828); appointed to the chair of natural philosophy and astronomy at King's College, London (1831-45); canon of Bristol Cathedral (1853); chaplain to the Queen (1855); appointed government inspector of schools, he devoted much energy to the cause of primary education; wrote *Mechanical Principles of Engineering and Architecture* (1842), adopted as a West Point text-book, and *Lectures on Astronomy* (1847). He died at Olveston, Jan. 20, 1872.—His son, HENRY NOTTIDGE MOSELEY, an English naturalist, was born at Wandsworth, England, in 1844. Graduated at Exeter College, Oxford, 1868; studied medicine in London, Vienna and Leipsic; took part in the Ceylon and southern India expedition to observe the solar eclipse of 1871; member of the *Challenger* scientific expedition in 1872, he brought back fine botanical collections. On his return he was elected fellow of Exeter College, and wrote *Notes of a Naturalist on the Challenger* (1879), a book of intense interest and graphic descriptions; appointed Linacre professor of human and comparative anatomy in Oxford University in 1889. Wrote, beside a large number of scientific monographs and articles, *Oregon: Its Resources, Climate, People and Productions* (1879). He died in Cliveden, Nov. 10, 1891.

MOSELLE, a river. See FRANCE, Vol. IX, p. 506.

MOSENTHAL, JOSEPH, a German-American musician; born in Hesse-Cassel, Germany, Nov. 30, 1834; a pupil of his father, and of the violinist, Ludwig Spohr; settled in New York City in 1853; organist of Calvary Church from 1860 to 1887; also conductor of the Mendelssohn Glee Club since 1867 and of the Teutonia and New York vocal societies.

Composed valuable church music for the Episcopal service, and also secular choruses and songs.

MOSER, JUSTUS. See GERMANY, Vol. X, p. 535.

MOSKVA, a river of Russia. See MOSCOW, Vol. XVI, p. 855.

MOSS HAGS, an old time term that has come into currency with the popularity achieved by Crockett's Scotch novel, *The Men of the Moss Hags*. The term is of Border origin, and refers to the natural pits or quagmires in mossy ground, or any broken ground in a bog capable of offering concealment, and in which the Covenanters frequently took refuge when pursued by the Royalists.

MOSSY CREEK, a village of Jefferson County, in southeastern Tennessee, on the Southern railroad, 29 miles E.N.E. of Knoxville. The Carson and Newman College, which is situated here, is a co-educational institution, controlled by the Baptists, and in 1896 had 10 instructors, 250 students and a library containing 3,000 volumes. Population 1890, 709.

MOSSQUERA, TOMAS CIPRIANO. See COLOMBIA, Vol. VI, p. 156.

MOSQUITO COAST and MOSQUITO RESERVATION. See NICARAGUA, Vol. XVII, p. 479.

MOSS-AGATE. See AGATE, Vol. I, p. 278.

MOSSBUNKER. See MENHADEN, Vol. XVI, p. 10.

MOSTAGANEM, a town of Algeria, on the coast, 45 miles N.E. of Oran. It manufactures pottery, and has corn-mills and tanneries. Population 1886, 13,900, more than one third being Europeans. It was a place of 40,000 in the sixteenth century, and has again grown up from its decayed state since the French took possession in 1833. Has a port available for small vessels, all larger ones going to Azrey, a distance of 19 miles.

MOTASALIS or MOTAZALITES. See ALMAMUN, Vol. I, p. 590.

MOTHER CAREY'S CHICKENS. See PETREL, Vol. XVIII, p. 712.

MOTHS. See BUTTERFLIES and MOTHS, Vol. IV, pp. 592-598.

MOTION. See MECHANICS, Vol. XV, pp. 752-764. Of fluids, see *Hydro-dynamics*, under HYDRO-MECHANICS, Vol. XII, pp. 457, 461, 519.

MOTION, in plants. See PHYSIOLOGY, Vol. XIX, pp. 57, 63.

MOTOORI, MORINAGA. See JAPAN, Vol. XIII, pp. 581, 587.

MOTORS FOR LOCOMOTION. With changes in methods of cheap local transportation, numerous competitors have appeared in the field formerly monopolized by the steam-locomotive. New motors have been devised and used to propel every sort of vehicle from heavy railway cars to bicycles. The motive powers employed are electricity, compressed air, coal-gas, gasoline, etc. Some hydraulic systems of propulsion have also been devised.

Perhaps the most conspicuous example of a successful electric locomotive is the one placed in the Belt Line tunnel of the Baltimore and Ohio railroad in 1895. In this, the electric motors, which are of the six-pole gearless type, are set direct upon the axles, so that the armatures surround them. The trucks have flexible supports for the motors, and

specially designed flexible couplings are used to transmit the motion from the armatures to the wheels. The armatures are of the ironclad type, having hollow shafts for the wheel-axles. Power is conveyed to the motors from an overhead conductor, much too large to be termed a wire, through a slider which serves the same purpose as the trolley-wheel of a trolley-car.

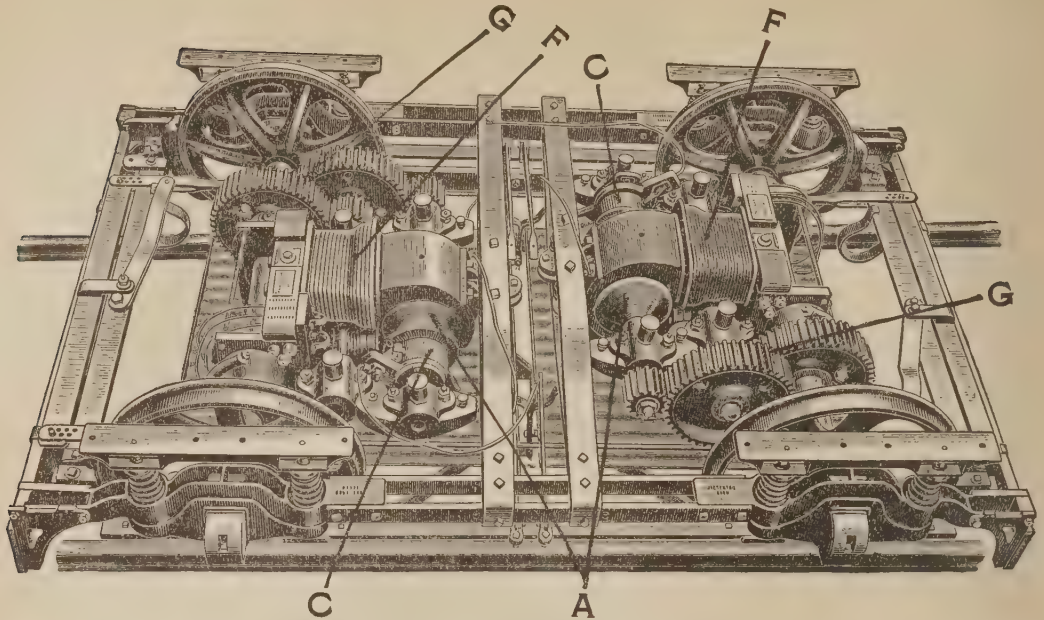
The Sprague electric locomotive is very similar to the above. Its motors have the armatures about the axles, the field-magnets consisting each of two castings having two field-coils placed at the ends of the motors, forming two consequent and two salient poles. The magnets are compound-wound, and the armatures of the slotted Westinghouse type.

For underground-work in mines, various kinds of electric locomotives have been built, ordinarily making use of some familiar form of street-railway motor. The Baldwin and Westinghouse concerns have built one which is driven by two Westinghouse motors, receiving the power through two trolley-arms. These motors are connected with the axles by double reduction-gears, being designed for heavy loads on steep grades at slow speed.

In the Brott system of electric locomotion, the motors are mounted on the car-axles, so that locomotives, commonly so-called, are dispensed with. The power is taken from a conductor below the cars, and any form of gearless motor may be used.

The common type of street-railway motor is shown in the accompanying illustration. As electric motors are not readily operated except at high speeds, sets of gear-wheels are introduced to reduce the speed so that it may be suitable for street-travel. These gears produce the familiar grinding noise heard below the cars, and the noise would be very much greater but for ingenious construction of the gears, with alternate plates of metal and rawhide or some similar device.

Compressed-air motors, driven from storage-tanks, are used on several European street-railways, and are being introduced into the United States. A motor for using compressed air consists primarily of a cylinder and piston, the air being admitted through ports, so as to drive the piston, after which the air is freed. This is the principle of the steam-engine cylinder, but in practice there are wide differences in the minor arrangements of the two mechanisms. Compressed air, when expanded, tends to withdraw the heat from everything in its vicinity, so that freezing may easily result unless provided against. It is also desirable to use the air heated, in order to secure as great expansive power as possible. These conditions have involved much experimentation in the production of economical motors. To partially avoid the loss of heat (which means, also, the loss of power) in compressing the air, the usual method is to compress air in three stages, recovering the heat of compression by passing the air through tubes around which cold water is circulating. The cooling water when heated is fed to the boilers, so that a large portion of the heat is thus saved. The cold air being stored in stout steel reservoirs at a pressure of say 2,000 pounds, the reservoirs are loaded on to the car that is to be driven. This pressure is far too



ELECTRIC MOTORS ON A STREET-RAILWAY TRUCK.

The current being supplied from the trolley wire to the brushes on the commutators, C C. The armatures, A, rotate within the poles of the field-magnets, F F, and motion is communicated to the axles of the truck through the reduction-gears, G.

great for use in a cylinder, hence the air is first let out into a receiving-cylinder, where a pressure of 50 to 150 pounds is obtained. It is next admitted to a heater for expansion, and as it carries from the heater a certain amount of steam, its expansive qualities are increased at the same time that the difficulties connected with freezing are avoided.

Gas-motors have been used for street-cars, ordinary coal-gas being employed, compressed simply to save space, and stored in tanks under the cars. The Luhrig gas-motor has four cylinders, all connected with one driving-shaft, so that the power may be always available, since gas-engines, as a rule, give out power only at every fourth stroke. The gas is admitted to the cylinders, mixed with a proper proportion of atmospheric air, and ignited, causing a miniature explosion which gives a thrust to the piston.

The MacMahon ammonia-motor was exhibited at the Chicago Exposition in 1892. It makes use of anhydrous ammonia, instead of water, in the boiler, the advantage being that the ammonia vaporizes or turns into steam at a very low temperature. As ammonia is expensive, a condensing-apparatus is provided for using it over and over again. Thus the cost of running is confined principally to the expense of the fuel, as is the case with the steam-engine.

For operating autocars, bicycles, railroad velocipedes, and other vehicles requiring small power, the gasoline-motor is generally preferred, because of the light weight of the fuel carried. The common principle of all these motors consists in allowing the gasoline to escape from a small tank, drop by drop, each drop being vaporized and mixed with

air in a cylinder, in such proportion that when a flame or electric spark is applied the mixture explodes and gives an impulse to the piston.

The hydraulic system of car-propulsion has not emerged from the experimental stage, though it possesses some peculiar advantages. The form that has attracted the most attention makes use of water-jets between the rails to drive the cars by impinging on pallets or buckets on the lower surface of the vehicles. The sliding hydraulic railway substitutes runners in place of wheels, a slippery surface being maintained on the rails by forcing water through minute holes in the surface of the runners, so that they actually slide on a very thin stratum of water.

While all these systems and forms of motors have their advocates and advantages, it is to the electric motor that the general public looks for improved means of locomotion. This motor has no power except that which is put into it from an outside source, yet it affords such conveniences in the way of transmission of power, that the minds of many thousands of inventors and engineers are turned toward its development. It should be remembered that a dynamo or generator and an electric motor are practically the same thing, only reversed in action. If you drive one by belt, or by direct connection with a steam-engine, you generate a current which may be conducted out on a wire to do useful work, as in lighting or in running motors. If you would use the same machine as a motor, you simply connect the wires with a source of electricity, and run it the other way, when power is developed, and you may use it to drive machinery.

The annexed diagrams show a very simple form of electric motor, which may assist in a correct un-

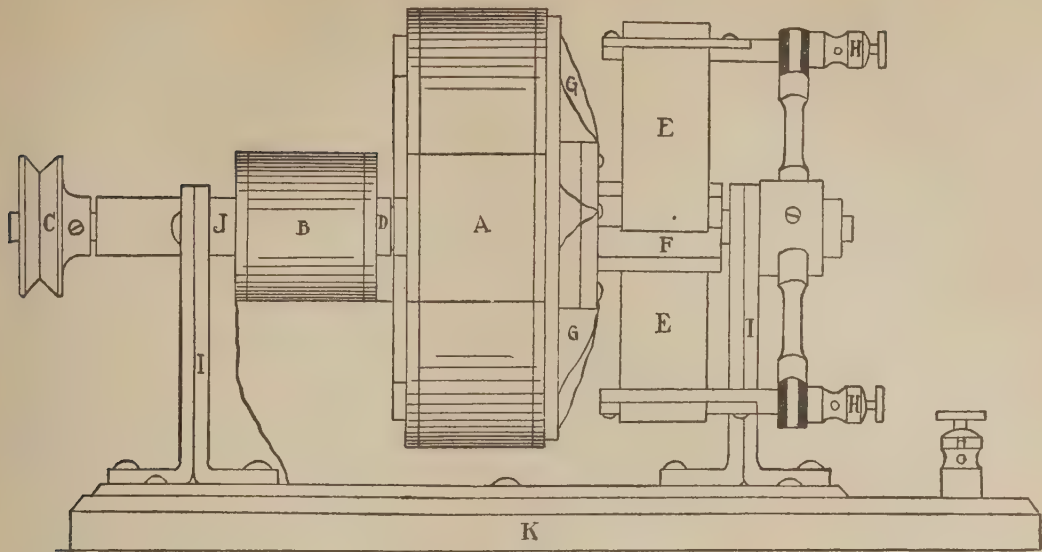


Fig. XI.

A—Armature. B—Field-magnet. C—Pulley. D—Pole-piece. E—Brush. F—Commutator. G—Wires connecting armature-coils with commutator-bars. H—Binding-posts. I—Standard. J—Yoke. K—Base-plate.

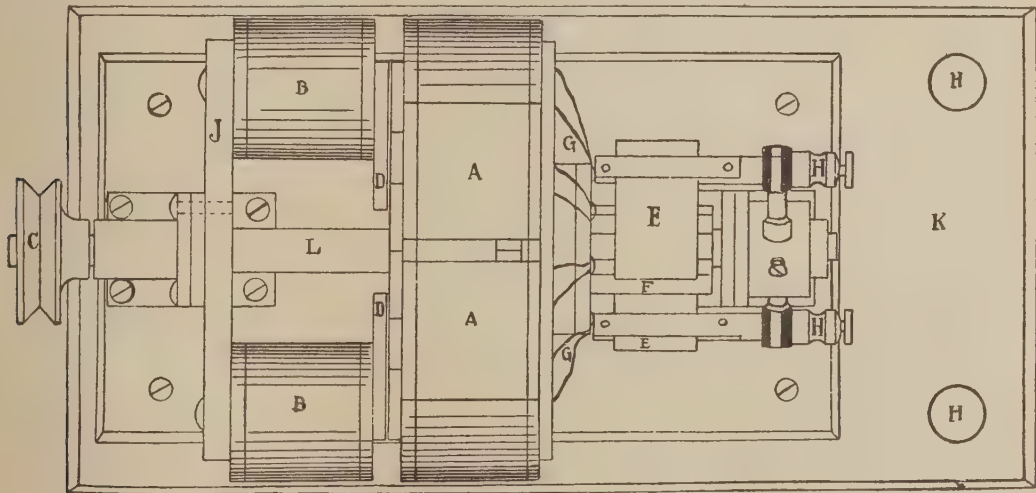


Fig. XII.

A—Armature. B—Field-magnet. C—Pulley. D—Pole-piece. E—Brush. F—Commutator. G—Wires connecting armature-coils with commutator-bars. H—Binding-posts. I—Standard. J—Yoke. K—Base-plate. L—Main staff.

derstanding of its principles. One is a side view, the other a top view of the same machine. The field-magnet here consists of two coils of insulated wire on soft iron cores. They are connected by a yoke, and the pole-pieces are magnetic when a current of electricity is run through the coils. Around the pole-pieces of this magnet are lines of force, such as may be observed with a toy horseshoe-magnet in playing with small tacks, steel fillings, etc. Within these lines of force the armature is rotated. In this case the armature is wheel-shaped, and has six inner coils of wire, connected by wires to the six bars of the commutator. The commutator-bars are

insulated from each other, and the inside end of one coil in the armature and the outside end of the next coil are fastened to one commutator-bar. The next coil in the armature is connected reversely to the next bar, and so on. The brushes are arranged to bear lightly against the surface of the commutator-bars, and are connected with wires leading from the binding-posts. To use the machine as a dynamo or generator of electricity, it is necessary to apply power to the pulley. This rotates the armature within the lines of force of the field-magnet, setting up an induced current of electricity, which is carried off through the brushes to the wires. To

use the machine as a motor, a current is led to the brushes, and the lines of force set up tend to rotate the commutator and armature, hence the pulley on the other end of the shaft, from which machinery may be driven.

C. H. COCHRANE.

MOTT, LUCRETIA COFFIN, an American philanthropist, and the wife of James Mott, the Quaker abolitionist; born at Nantucket, Massachusetts, Jan. 3, 1793. She married in 1811, and in 1819 became a Quaker exhorter, and noted for the refinement and eloquence of her discourses. She assisted in the formation, in Philadelphia, of the American Anti-slavery Society in 1833, and in 1840 went to London as its representative. She was one of the four women who called together the Equal Rights and Woman's Suffrage Convention at Seneca Falls, New York, in 1848, and she gave a great deal of her time to the cause. She helped to found the Woman's Medical College in Philadelphia. She died near Philadelphia, Pennsylvania, Nov. 11, 1880.

MOUFFLON. See SHEEP, Vol. XXI, pp. 784, 785.

MOUKDEN, CITY OF. See MANCHURIA, Vol. XV, p. 466.

MOUKHTAR-PACHA-GHAZI, AHMED, an Ottoman general; born Oct. 31, 1839, at Broussa, Anatolia; graduated with honors at the Constantinople Military Academy; entering the staff corps as a captain, he distinguished himself against the Montenegrin insurgents in 1860; professor of astronomy, tactics and fortifications at the military academy in 1861-63; as lieutenant-colonel he was appointed tutor to the eldest son of Sultan Abdul-Aziz in 1865; made a member of the Imperial Council of War in 1869; the same year he subdued the rebellion of twenty thousand Arabs in Yemen, and placed in command of the Turkish troops in the region with the rank of ferik (general of division). In 1871, aged 33, he was made mushir (full general) and governor of Yemen; transferred to Crete in 1873; commander of the Shumla Army Corps; a year later he was made governor of Armenia. In 1876 he commanded in Bosnia, Herzegovina and Montenegro, gaining twenty battles and losing one. Appointed governor of Armenia when the Russo-Turkish war began in March, 1877, he organized and sustained the defense of his province against enormous odds. Was made a Ghazi (or conqueror), the highest title in the gift of the Sultan, in October, 1877; grand master of artillery in 1878; since 1885 represented the Sultan at the Egyptian court.

MOULD OR MOLD. See FUNGUS, Vol. IX, p. 830; and BOTANY, Vol. IV, p. 107.

MOULDING OR MOLDING. See ARCHITECTURE, Vol. II, pp. 467, 468; and BUILDING, Vol. IV, pp. 473, 487, 488, 506. A process, see FOUNDRY, Vol. IX, pp. 479-481; and POTTERY and PORCELAIN, Vol. XIX, p. 638.

MOULINS. See GLACIER, Vol. X, p. 627.

MOULTING OR EXUVIATION. See BIRDS, Vol. III, pp. 775, 776.

MOULTON, ELLEN LOUISE CHANDLER, an American writer; born in Pomfret, Connecticut, April 5, 1835; educated at the Willard Seminary,

Troy, New York; published her first successful book, *This, That, and the Other*, at 19; married W. A. Moulton, a Boston publisher, and wrote children's stories, novels, essays and poems. Among the best known are *Bedtime Stories* (1873); *Some Women's Hearts* (1874); *More Bedtime Stories* (1880); *Swallow-flights, and Other Poems* (1878); *Random Rambles* (1881); *Firelight Stories* (1883); *Ourselves and Our Neighbors* (1887); *In the Garden of Dreams* (1890).

MOULTON, WILLIAM FIDDIAN, an English divine and educator; born at Leek, England, in 1835; graduated M.A. of London University, being awarded the gold medal in mathematics and the prize in Scriptural examination and Biblical criticism. Entering the Wesleyan ministry, he was classical tutor in the Wesleyan Theological College, Richmond, from 1858 to 1874; headmaster of "The Leys," Cambridge, the new Wesleyan school (1874), making it a great success; president of the Wesleyan Conference (1890); was an active member of the New Testament Revision Committee (1870-80); after that was busy on marginal references of the revised editions. Wrote a *Popular History of the English Bible* (1878); *Commentaries on the Epistle to the Hebrews* (1879). A D.D. of Edinburgh in 1874, and an M.A. of Cambridge in 1877.

MOULTRIE, FORT, a fortress on Sullivan's Island, at the mouth of Charleston harbor, South Carolina, celebrated for the repulse of a British squadron commanded by Sir Peter Parker, Jan. 28, 1776. The fort, which had 26 guns and 435 men, had been hastily built of palmetto logs in two rows 16 feet apart, with the space between filled with sand. The spongy wood of the palmetto was found to resist the cannon-balls perfectly. The British men-of-war *Bristol* and *Experiment* suffered so much from the skillful firing of the American cannoners that they had to be withdrawn to escape sinking.—The organizer and commander in this remarkable feat of war was WILLIAM MOULTRIE (born in England in 1731), who, at the outbreak of the Revolutionary War, was appointed colonel of the Second Colonial Regiment, and had the rude fort which bore his name built as a defense of Charleston harbor. Later, as brigadier-general, he commanded American forces in Georgia and South Carolina, defeating, near Beaufort, in 1779, a large British corps under Gardiner. In 1780 Moultrie was forced to surrender, on Charleston's being captured. For two years a prisoner, he proudly declined a colonelcy in the British army. He was major-general in 1782; governor of South Carolina in 1785 and 1794. His last years were devoted to preparing his *Memoirs of the American Revolution, so far as It Related to North and South Carolina and Georgia* (2 vols., 1802). He died in Charleston, Sept. 27, 1805.

MOUND-BUILDERS. See AMERICA, Vol. I, pp. 691-693.

MOUND CITY, a post village and the capital of Pulaski County, Illinois, seven miles N. of the mouth of the Ohio River, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It contains a national cemetery, and had formerly the United States navy-yard. It has two barrel facto-

ries and a boat-building yard. Population 1890, 1,965.

MOUND CITY, a city in Holt County, northwestern Missouri, 45 miles N. by W. of St. Joseph, on the Chicago, Burlington and Quincy railroad. It has considerable canning interests, and is in an agricultural and stock-raising region. It is known for its mineral springs. Population 1890, 1,193.

MOUNDSVILLE, a city and the capital of Marshall County, northwestern West Virginia, 11 miles S. of Wheeling, on the Ohio (navigable) River, and on the Baltimore and Ohio, the Ohio River and the Moundsville, Benwood and Wheeling railroads. It is in a coal-mining and farming region; manufactures cotton, wool, glass, asbestos articles, shoes, bricks and lumber. It has an electric railway and lights and city water; contains the state prison. Its name was originally Grave Creek, but it was changed, its new name coming from a mound in which were discovered, in 1838, two sepulchral chambers formed of logs, and containing human skeletons. The mound is conical in shape, being about 70 feet high and 900 feet in circumference. Population 1890, 2,688.

MOUNET, JEAN SULLY (stage-name "Mounet-Sully"), a French actor; born at Bergerac, France, Feb. 27, 1841; graduated from the National Conservatory of Music and Declamation, Paris, in 1868, with a first tragedy prize; served in the army during the Franco-Prussian war of 1870-71; was about giving up the stage when he was allowed to play the part of *Orestes*, at the Comédie Française, in 1872, and was so successful that on Jan. 1, 1874, he was elected a member of this famous company. When his talent had matured and widened, he was recognized as the leading living French tragedian. He possessed a fine, powerful physique, eyes full of southern fire, and a wealth of stately gestures. He obtained his greatest successes in the plays of Racine, Corneille, Voltaire, and Victor Hugo, and in adaptations from Shakespeare and Sophocles. He also succeeded brilliantly in more modern dramas by Augier, Dumas père and Dumas fils, etc.

MOUNTAIN-ASH, a name given to certain species of the genus *Pirus*, with pinnate leaves, large clusters of white flowers and scarlet berry-like fruit. The genus belongs to the family *Rosaceæ*, and the species with simple leaves are the well-known apples and pears. The two American mountain-ashes are *P. Americana* and *P. sambucifolia*, both indigenous toward the north, and often planted for ornament. *P. aucuparia*, a European species, also is cultivated often.

MOUNTAIN-LION. See **PUMA**, Vol. XX, pp. 104, 105.

MOUNTAIN RAILWAYS are lines of railway having gradients too steep to be overcome by the ordinary type of locomotive. Among the first devices used to haul cars up an incline, to the track of which the wheels of a locomotive would not adhere by reason of the grade, was that of attaching a cable to the car, and pulling it to the top of the grade by power derived from an engine there located. Another method long in use was that of laying toothed or rack rails on the line of track to engage cogs either

in the circumference or on the axle of the drive-wheel of the locomotive. Still another method consisted of attaching the car by clamp-wheels to an endless, moving cable passing over grooved wheels at either end of the route and supported by sheaves at regular distances in the middle of the track, the cable being propelled by passing over a large drum, to which motion was given by a stationary engine located at the top of the incline. Of recent years the electric trolley system has been successfully used on mountain railways of moderate grades.

One of the earliest mountain roads constructed in the United States was the line running from the mines at Summit Hill to Mauch Chunk, Pennsylvania, a distance of nine miles, which was completed May, 1827. It was used to carry coal, the gradient was 95 feet per mile, and up to 1844 the road was operated entirely by gravity, the cars being drawn back to the mines, over a circuitous route, by mules. At the latter date the empty cars were drawn up an inclined plane by cables operated by an engine located at the top of the inclines, of which there were two, the first with a length of 2,070 feet and a grade of 23 per cent, and the second with a length of 2,322 feet and a grade of 29.8 per cent.

In 1833 a road 36 miles in length, extending from Hollidaysburg to Johnstown, Pennsylvania, and called the Allegheny Portage road, was built in ten planes, varying from 7 to 10 per cent gradient. The longest plane was 3,116 feet in length, and all were provided with stationary steam-engines at the summits, propelling endless cables. This road was abandoned about 1853. Throughout the mining districts of Pennsylvania, mountain roads operated entirely by gravity have been in operation for many years. The weight of the loaded cars going down the grade brought back the empty cars, and by a system of different planes long distances were often traversed. In 1887 a road was completed up Look-out Mountain, Tennessee. The length, measuring up the slope, was 4,360 feet, and the grade 26 per cent, on the average. The Catskill railway, completed in 1892, was 7,000 feet in length, the average grade about 12 per cent, the maximum being 43 per cent. It was, up to 1896, the longest mountain road operated by cable in the United States.

The first application of the rack-rail system in this country was at Madison, Indiana, in 1847. The locomotives were equipped with toothed wheels on the driving-axles, which engaged with the teeth of rack-rails laid on the track. The length of the plane was 7,040 feet, and the gradient 5.8 per cent, on the average. The Mount Washington railway, completed in 1869, is 3.33 miles in length, the maximum grade 40 per cent, the minimum 13 per cent. The locomotives were so constructed as to have the boilers nearly horizontal when on the average grade. In 1882 a road was built at Mount Desert, Maine, the total length of which was 6,300 feet. The grades were alternately steep and light, the maximum being 33 per cent. The locomotive drew one car at a time, at an average speed of from three to four miles per hour.

In 1890 a road ascending Pike's Peak, in Colorado, was constructed for a distance of almost nine

miles, reaching an altitude of 14,134 feet. For about two miles the maximum grade is about 25 per cent, the remainder of the distance varying from 12 to 22 per cent. The system used to make the ascent is that of having the locomotive equipped with four cylinders. The outer two operate the drive-wheels running on ordinary rails. The inner pair of cylinders operate a central toothed wheel, which runs on a single racked rail, laid on such portions of the line as are of steep gradient. The Mont Cenis railway, completed in 1865, and the Rigi railway, completed in 1871, both in Switzerland, are operated by the rack-wheel system, and the Zermatt railway, 22 miles in length and opened in 1891, is operated by the combined system, as above described.

The Mount Lowe railway, in southern California, is an example of mountain railway-construction almost without a parallel for engineering difficulties. The road runs in two sections, the first starting from a point 2,200 feet above the sea-level, and extending to the summit of Echo Mountain, 3,600 feet in altitude. The incline is about 3,000 feet in length, and makes a direct ascent of 1,400 feet. The grade at the beginning is 60 per cent; after passing the midway point in the incline it is 62 per cent for quite a distance, then it falls off to 58 per cent, and on nearing the summit is 48 per cent. The cars are permanently attached to an endless cable, tested to a strain of 100 tons, while the maximum load never exceeds five tons. The cars are so balanced as to pass each other at an automatic turnout, exactly in the middle of the incline, and are so arranged as to keep the passengers always on the level, regardless of the steep grades of the incline. An electric line extends to the summit of Mt. Lowe, 6,000 feet above the sea-level. The cars are easily propelled, the grades for a distance of four miles scarcely exceeding seven per cent.

Of the mountain railways in Europe, other than those mentioned, Italy has the longest cable inclines in the world. The road ascending Mount Vesuvius is 10,500 feet in length, divided into two planes, one of 6,900 feet, the other 3,600 feet. A road 10,243 feet in length ascends Superga Mountain, but the grade is not in excess of 20 per cent on any portion of the route. That on Mount Pilatus, in Switzerland, is 2.8 miles in length, with maximum grades of 48 per cent. A railway connecting the towns of St. Gallen and Gais, Switzerland, has five planes, with rack-rails, the maximum gradient on one of the planes being 92 per cent.

Mountain railways not using the devices spoken of above rarely have grades exceeding five per cent. To reduce the grades of the lines, recourse is had to spirals, zigzags, switchbacks or "W's". In ascending a considerable elevation, the line is often made to cross itself at different points, by means of bridges or tunnels. The St. Gothard railway has tunnel-spirals on both the Italian and Swiss sides of the Alps Mountains. A notable case of road-spiral and zigzag combined is that of the Union Pacific, near Georgetown, Colorado. Starting up the mountain, the road climbs a grade of about three per cent, and, forming an ellipse, crosses the starting-point of the

figure at an elevation of 75 feet. When the grade again increases, a sharp curve is made, and a zigzag course taken which retains the grade at a point enabling the locomotive to make the ascent. In climbing a mountain by the switchback or "W" method, the train proceeds at as steep a grade as possible, then, instead of making a curve, a switch is thrown, and the train backs up a grade, similar to the first, to another switch, which, being thrown, enables the train to proceed forward again. This operation is continued until the ascent of the elevation is accomplished.

A project for the construction of a line of railway to the summit of Mont Blanc was discussed in 1895 and operations began the following year. The road is to commence at the Miage Ravine, above St. Gervais, immediately passing through a tunnel about 2,400 feet in length. From here a vertical shaft about 9,100 feet in height will carry the passengers to the summit. The estimated cost is \$1,800,000, the time of construction ten years. The tunnel is to go in a straight line to the Italian frontier, which would then be skirted for about 4,875 feet. By this means the Mont Blanc Observatory could be reached at all seasons.

MOUNT AIRY, a town in Surrey County, north-western North Carolina, on the Ararat River, and on the Cape Fear and Yadkin Valley railroad, 151 miles N.W. of Raleigh and 90 miles N. of Charlotte. It contains granite-quarries and several mineral springs, besides an academy and several mills. Population 1890, 1,768.

MOUNT ANGEL COLLEGE, located at Mount Angel, a small place on the Southern Pacific railroad, 19 miles from Salem and 31 miles from Portland, Oregon, is a Catholic institution conducted by priests. It had, in 1896, 20 instructors, 85 students and a library of 7,500 books.

MOUNT AYR, a town and the capital of Ringgold county, Iowa, in the southern part of the state, near the west fork of the Grand River, on the Chicago and Great Western and the Chicago, Burlington and Quincy railroads, 90 miles S. of Des Moines. It has pump, fencing and cigar factories. Population 1880, 1,265; 1895, 1,385.

MOUNT CARMEL, a city and the capital of Wabash County, southeastern Illinois, on the Cleveland, Cincinnati, Chicago and St. Louis railroad, is 132 miles N.E. of Cairo, has abundant water-power and manufactures of wooden dishes, lumber, iron and flour. Railroad-shops are also situated here. Population 1890, 3,376.

MOUNT CARMEL, a post borough and a railroad junction of Northumberland County, Pennsylvania, on the Lehigh Valley and the Philadelphia and Reading railroads, 28 miles E. of Sunbury; has good anthracite coal-mines, which give employment to many men. The town has one daily paper. Population 1890, 8,254.

MOUNT CARROLL, a city and the capital of Carroll County, situated in northwestern Illinois, 128 miles W. of Chicago, has a female seminary, two libraries and a public school. Its principal industries are farming, mining and stock-raising. Population 1890, 1,836.

MOUNT CLEMENS, a city and the capital of Macomb County, Michigan, 20 miles N.E. of Detroit, on the Grank Trunk railroad. It is a much-frequented summer resort, and has gained a great deal of popularity on account of its celebrated mineral springs, which are claimed to be beneficial to those suffering from rheumatism; a regular steamboat line runs daily between Detroit and this place; there are manufactures of cigars, lumber, salt, sash and blinds; also an iron furnace, union school and a public library. Population 1890, 4,748; 1894, 5,647.

MOUNT DESERT ISLAND, a mountainous island, 15 miles long and 12 miles wide, in the Atlantic Ocean, one mile off the coast of Maine, and belonging to Hancock County. Among its villages are Bar Harbor, Northeast and Southwest Harbors, Soamesville, Asticon, Seal Harbor, Seal Cove and East Eden. It is noted for its picturesque scenery, and is a select and fashionable summer resort. Mount Desert Island post-office is at Soamesville. Population 1890, 5,337.

MOUNT FOREST, a village of Wellington County, Ontario, about 100 miles W. of Toronto, on the Canadian Pacific and the Grand Trunk railroads, also on the south branch of the Saugeen River, a tributary of Lake Huron; it has 2 saw-mills, 3 flouring and grist mills, 2 woolen-mills, an iron foundry, an agricultural-implement factory, 2 tanneries, 2 brick-fields, and a pottery; it also has good water-power. Population 1891, 2,214.

MOUNT GILEAD, a village and the capital of Morrow County, in central Ohio, on the Cleveland, Cincinnati, Chicago and St. Louis and the Toledo and Ohio Central railroads. It lies 45 miles N. of Columbus, and is in a rich farming country, and has several manufactures, among which are those of machinery, carriages and cider-presses. Population 1890, 1,329.

MOUNT HOLLY, a post village, railroad junction and the capital of Burlington County, southern central New Jersey, 17 miles S. of Trenton, on the Pennsylvania and the Tuckerton railroads, and on Lancocas Creek. The town is supplied with gas and waterworks, and contains a children's home, iron foundries, thread, saw and planing-mills, machine-shops, turbine-wheel, cotton goods and plow factories. It has a large state fair-grounds and canning factories. Population 1890, 5,500; 1895, 5,750.

MOUNT HOLYOKE COLLEGE, an institution for the education of young women, located at South Hadley, Massachusetts. It was founded in 1836, by Mary Lyon, as Mount Holyoke Seminary. As such it was maintained until 1888, when it became, under a new charter, Mount Holyoke Seminary and College. Again, in 1893, a change was made; the word *Seminary* was dropped, and the legal title made Mount Holyoke College. There were, in 1895, 34 instructors, 335 students, and 16,000 volumes in the library. The grounds are not far from the Connecticut River, and consist of 70 acres. There were, in 1895, six buildings, including well-equipped scientific laboratories.

MOUNTJOY, a post borough of Lancaster County,

southeastern Pennsylvania, 12 miles N.W. of Lancaster, on the Pennsylvania railroad. It is a manufacturing town, producing carriages, agricultural tools, woolen goods, iron castings, flour and furniture; contains seminaries for men and women, and a school for soldiers' orphans. Population 1880, 2,058; 1890, 1,848.

MOUNT MORGAN, a gold-mining township of Raglan County, Queensland, 23 miles S.S.W. of Rockhampton. The gold-mine at the summit of the mount is said to be the richest deposit in Australia, and is very remarkable from a geological point of view. It is found in the crater of an extinct geyser, amidst great blocks of brown hematite, iron ore and siliceous sinter. The gold is of unusual fineness and purity. Population, about 4,000.

MOUNT MORRIS, a post village and railroad center of Livingston County, western New York, 32 miles S. by W. of Rochester, on the Genesee River, and on the Delaware, Lackawanna and Western, the New York, Lake Erie and Western, the Western New York and Pennsylvania and other railroads. It manufactures plaster, lumber, iron, machinery, salt, flour, cigars and brooms, and has an academy and seminary. Population 1890, 2,286.

MOUNT PLEASANT, a city and the capital of Henry County, southeastern Iowa, 36 miles N.W. of Burlington, on the Chicago, Burlington and Quincy and the St. Louis, Keokuk and Western railroads. It manufactures flour, wagons, sashes and blinds, farm tools; contains Iowa Wesleyan University, an academy, and a female seminary. In the vicinity is the State Hospital for the Insane. It has waterworks, gas and electric light plants, banks and papers. Population 1890, 3,997; 1895, 3,920.

MOUNT PLEASANT, a city and the capital of Isabella County, central Michigan, 46 miles W. of Bay City, on the Chippewa River and the Ann Arbor and the Flint and Pere Marquette railroads. It is in a good farming region, and is largely engaged in the lumber trade. Flour, lumber, castings, baskets, sashes, doors and blinds are made here, and the city is lighted with electricity. It is the seat of the Central Michigan Normal School and an Indian industrial school. Population 1890, 2,701; 1894, 3,178.

MOUNT PLEASANT, a village of Cabarrus County, western North Carolina, 6 miles E. of Concord, the county seat and nearest railroad station, which is on the Southern railroad. It is notable only as being the seat of North Carolina College, a Lutheran school, founded in 1859, which in 1896 had 5 instructors, 72 students, and a library of 1,500 volumes. Population of village, 375 in 1890.

MOUNT PLEASANT, a post borough of Westmoreland County, southwestern Pennsylvania, 30 miles S.E. of Pittsburg, on the Pennsylvania and the Baltimore and Ohio railroads. It is chiefly engaged in manufacturing lime and coke, in mining, and in shipping the limestone here quarried. It is the seat of the Western Pennsylvania Classical and Scientific Institute, and has several national banks and newspapers. Population 1890, 3,652.

MOUNT PLEASANT, a town and the capital of Berkeley County, central southern South Carolina,

on the northern shore of Charleston harbor. It is in an agricultural region, has a saw-mill and a tile factory. It is a summer resort. Population 1890, 1,138.

MOUNT PULASKI, a post village of Logan County, central Illinois, on the Peoria, Decatur and Evansville and the Illinois Central railroads, 10 miles S.S.E. of Lincoln. It is in a grain and stock-raising and mining region, and contains elevators and mills. Population 1890, 1,357.

MOUNT-STEPHEN, GEORGE STEPHEN, a Canadian capitalist and philanthropist; born in Dufftown, Scotland, Feb. 5, 1829. In 1850 he went to Canada; in 1876 was president of the Bank of Montreal; in 1878 president of the Manitoba and Minneapolis railroad; in 1881 president of the Canadian Pacific railroad; he was created a baron in 1886. His gift, in junction with his cousin, Sir Donald Smith, of one million two hundred and fifty thousand dollars for the establishment of Montreal Victoria Hospital in 1887, is the greatest of his many benevolences.

MOUNT STERLING, a town and the capital of Brown County, western Illinois, 32 miles E. of Quincy, on the Wabash railroad. It is in a rich grain, live-stock and timber-producing region, and it has deposits of coal and brick-clay. The town manufactures drain-tiles and has carding and woolen mill and flour-mills. Population 1890, 1,655.

MOUNT STERLING, a city and the capital of Montgomery County, northeastern central Kentucky, 26 miles E. of Lexington, on the Chesapeake and Ohio railroad. It is the distributing-point for a large region; has manufactories of lumber, flour, woolen goods and machinery, and has a military and several public schools and a public library. Population 1890, 3,629.

MOUNT VERNON, a city and the capital of Jefferson County, central southern Illinois, about 76 miles E.S.E. of St. Louis, on the Louisville and Nashville, the Louisville, Evansville and St. Louis, the Chicago, Paducah and Memphis and other railroads. It has large flour and woolen mills, car-shops and saw and planing mills. Population, 3,233.

MOUNT VERNON, a city and the capital of Posey County, southwestern Indiana, 19 miles W. of Evansville, on the Louisville and Nashville and the Evansville and Terre Haute railroads. It is on the Ohio River, by which it has a large river commerce, and contains flour and lumber mills and is in a fertile farming district. Population 1890, 4,705.

MOUNT VERNON, a town of Linn County, central eastern Iowa, 13 miles E. of Cedar Rapids, on the Chicago and Northwestern railroad. It is in a farming region, and has papers, banks, and two libraries—a public library, containing four thousand volumes, and Cornell College, containing 13,500. Cornell College, founded here in 1857, is a co-educational Methodist-Episcopal institution, which in 1896 had 30 instructors, 562 pupils and an annual income of about \$25,000. Population 1890, 1,259; 1895, 1,178.

MOUNT VERNON, a city of Westchester County, southeastern New York, 15 miles N. of

New York, on the New York Central and Hudson River and the New York, New Haven and Hartford railroads. It manufactures carriages, glue, horn and rubber jewelry and pens, but it is principally a residence place for business men. Population 1890, 10,830.

MOUNT VERNON, a city of Ohio. It is essentially a manufacturing city, having extensive engine and locomotive works, flour-mills, bent-wood, carriage and wagon and furniture factories. Mount Vernon Academy and KENVON COLLEGE (q.v., in these Supplements) are near here, the latter being at Gambier, five miles to the east. Population 1890, 6,027. See **MOUNT VERNON**, Vol. XVII, pp. 4, 5.

MOUNT VERNON, a township of Fairfax County, northeastern Virginia, on the Potomac River, 15 miles below Washington, on the Washington, Alexandria and Mount Vernon railroad. It contains the Washington homestead and the tomb of George Washington and his wife. This historic property was in 1858 purchased by the Ladies' Mount Vernon Association, by which organization it has been preserved with great care, and is annually visited by thousands of tourists.

MOWAT, SIR OLIVER, a Canadian legislator; born in Kingston, Ontario, July 22, 1820. He was called to the bar in 1841 in Upper Canada; began practice in Toronto; was a member of the Canadian assembly (1857-64); provincial secretary in August, 1858; Postmaster-General (1863-64); Vice-Chancellor Upper Canada (1864-72); and Premier of Ontario (1872). He was knighted in 1892. In 1896 he resigned the Ontario Premiership and became Minister of Justice in the Laurier Dominion Cabinet.

MOWING-MACHINES. See **HARVESTING MACHINERY**, in these Supplements.

MOXOS. See **MOJOS**, in these Supplements.

MOZAMBIQUE CHANNEL, a channel between Madagascar and the east coast of Africa, about one thousand miles in length and four hundred in average breadth. At its northern extremity lie the Comoro Islands.

MTSKHETHA, probably the most ancient town of the Caucasus, and, down to the fifth century, the capital of the old Georgian kings. It stands on the south side of the Caucasus, 10 miles N.N.W. of Tiflis. It contains a cathedral, already existing in the fourth century, in which the Georgian kings were crowned and buried. When the Poti-Tiflis railway was constructed, an ancient necropolis was laid bare; the graves were those of a cannibal race, and furnished proof that the modern Georgians are the direct descendants of the ancient Iberi.

MUCORACEÆ, suborder of Fungi. See **FUNGUS**, Vol. IX, pp. 830, 831.

MUCOUS MEMBRANE. See **ANATOMY**, Vol. I, pp. 847-849; and **DIGESTIVE ORGANS**, Vol. VII, pp. 221-227.

MUDFISH OR **BOW-FIN** (*Amia Calva*). See **ICHTHYOLOGY**, Vol. XII, p. 688.

MUD-HEN, a popular name of several birds of the rail family. The name is usually applied to the marsh, or moor hen (*Gallinula Galeata*) of the Old World and to allied species in all temperate regions. The name is sometimes applied to the

coot (*Fulica America*), which ranges all over North America.

MUDIE, CHARLES EDWARD, an English bookseller, founder of the celebrated library which bears his name; born in Chelsea, England, in 1818. Having started as a bookseller, he established his library in 1842, which became a limited company in 1864. In 1890 it had 25,000 members and its annual receipts were \$500,000. He published *Stray Leaves* (1872). Died Oct. 28, 1890.

MUD-PUPPY, a popular name generally applied to the salamander *Necturus* or *Menobranchus*. The name is often given to the hell-bender (*Cryptobranchus*) and to related genera.

MUEZZIN, the title of the official of a Mohammedan mosque, whose duty it is to ascend the minaret of the mosque at stated times and call the believers to prayers. His call is in the form of a chant. The words so chanted are: "Allah is most great. I testify there is no God but Allah. I testify that Mohammed is the apostle of Allah. Come to prayer. Come to security." This call is known as the ezann. It is varied by additions at times, and the muezzin gives a special call at midnight for those who desire to perform their devotions at that time.

MUGWUMP. This term is used in modern political parlance for a person who objects to lending his support to the nominees of the national party to which he professes to belong, and with whose general principles he has in the past been in sympathy. The word is said to be a corruption of the *mugquomp* of the Algonquin Indians. This word was employed by John Eliot in the translation of the centurion, duke or leader mentioned in the Bible in Gen. xxxvi: 15. As employed by Eliot, it is a complimentary term, meaning "a man with a following." Tradition ascribes another use of the word, by an Indian who interpreted it to mean "one who thinks more of himself than he really ought." The latter definition was used extensively, modified into "any one who poses as a thinker independent of his political party." The term mugwump was used derisively in 1840, 1865, 1872, and other political years, of men who "bolted" the party ticket. It did not, however, come into general use until 1884, in the Blaine-Cleveland campaign, when those Republicans who refused to support Blaine, and gave their allegiance to Cleveland, were termed mugwumps. The superiority of intellect which these so-called Independent Republicans assumed caused them to be termed "Holier-than-thou men," which is the best definition of the derisive use of mugwump.

MÜHLBACH, LOUISA MÜLLER, pseudonym of MUNDT, KLARA, q.v., in these Supplements.

MÜHLBERG, a town of Prussian Saxony, on the Elbe, 36 miles S.E. of Wittenberg. Here, April 24, 1547, the Emperor Charles V defeated John Frederick the Magnanimous, Elector of Saxony. Population, 3,441.

MÜHLENBERG, HEINRICH MELCHIOR, a German-American clergyman, founder of the Lutheran Church in America; born in Einbeck, Hanover, Sept. 6, 1711. He studied at Göttingen and Halle. He was ordained a minister in 1739, and was sta-

tioned in Saxony until 1741. He went as a missionary to Pennsylvania and served as pastor of German congregations in New Providence, Philadelphia and New Hanover. To his labors was due the growth of the German Lutheran Church, and from 1742 to 1776 he was active in organizing churches in all of the colonies and in exercising a general superintendence over the Lutherans of America. He was an ardent patriot, and did much, through his church influence, to aid the Revolutionary cause. He died in Trappe, Pennsylvania, Oct. 7, 1787.—His eldest son, JOHN PETER GABRIEL, an American soldier; born Oct. 1, 1746, in Trappe, Pennsylvania. At the beginning of the Revolution he was the pastor of a Lutheran Church in Woodstock, Virginia. He was appointed a colonel by Washington, and wore his uniform for the first time when he preached his farewell sermon. His first regiment was composed of members of his congregation. He was assigned to duty at first in the Southern states, but afterward took part in the battles of Germantown, Brandywine, etc. He attained the rank of major-general, and after the war served in Congress in 1789-95 and in 1799-1801. He died near Philadelphia, Oct. 1, 1807.—FREDERICK AUGUSTUS, also a son of Heinrich Melchior, a statesman; born Jan. 1, 1750, in Trappe, Pennsylvania. He entered the Lutheran ministry, and served until 1779, when he was elected to Congress. He served in the House of Representatives in 1779-81 and 1789-87, and during that time in the First and Third Congresses, was speaker of the House. He died in Lancaster, Pennsylvania, June 4, 1801.—WILLIAM AUGUSTUS, great-grandson of Heinrich Melchior, a Protestant Episcopal clergyman; born in Philadelphia, Pennsylvania, Sept. 16, 1796. He was graduated from the University of Pennsylvania in 1814; was ordained into the ministry of the Protestant Episcopal Church in 1817. He was rector of parishes in Philadelphia, Long Island, and in 1846 of the Church of the Holy Communion, New York. In the last-named place he organized the first Protestant Episcopal sisterhood in 1852, and was instrumental in the founding of St. Luke's Hospital, of which he was superintendent. He was the author of a number of hymns, among them *I Would not Live Alway*, and *Like Noah's Weary Dove*. He also wrote several works on church music. These include *Church Poetry*, etc. (1823); *Music of the Church* (1847); and *Family Prayers* (1861). He died in New York City, April 8, 1877.

MÜHLENBERG COLLEGE, an educational institution for men, located at Allentown, Pennsylvania. It is primarily a preparatory college for candidates for the Lutheran ministry, and is under the control of that denomination. It was organized in 1867, and has an endowment of about \$150,000. From the time of its organization until 1895, 370 had graduated. There were, in 1895, 12 in the faculty, 172 students, and a library of about 10,000 volumes.

MUIR, JOHN, an American naturalist and writer; born in Scotland, in 1836. His parents removed to the United States and settled in Wisconsin in 1850. He went to California in 1868, making his headquarters for a number of years in the neighborhood

of the Yosemite Valley. An ardent lover and student of nature, he made a comprehensive study of the glacial formation of the valley as well as of its botanical features. In 1879 he made explorations in Alaska, discovering the glacier which bears his name. In 1881 he accompanied an Arctic expedition in search of the *Jeanette*. He published several works, including *The Mountains of California* (1894); and his articles on *The Water-Ousel*, *The Shasta Bees*, *The Douglas Squirrel* and *The Mountain Sheep* are prose poems. Emerson, upon returning from California in 1871, said of Mr. Muir: "He is more wonderful than Thoreau!"

MUIR, SIR WILLIAM, brother of JOHN MUIR, Sanskrit scholar (q.v., Vol. XVII, p. 13), was born in 1819. When 18 years old he joined the Bengal civil service. He was created a knight in 1867; was lieutenant-governor of the Northwest Provinces, (1863-74); and financial minister to the government of India (1874-76). After his return to England he served on the council of India (1876-85), when he was elected principal of the University of Edinburgh. He was an eminent Arabic scholar, and his *Life of Mohammed* (1861); and *Annals of the Early Caliphate* (1883), are works of enduring value.

MUKDEN, same as MOUKDEN. See MANCHURIA, Vol. XV, pp. 466, 467.

MULFORD, ELISHA, an American ethico-political writer, was born Nov. 19, 1833, in Montrose, Susquehanna County, Pennsylvania; graduated in arts at Yale in 1855; studied theology in Andover, Heidelberg and Halle; took episcopal orders on his return home; rector of parishes in Darien, Connecticut, and South Orange, New Jersey, from 1861 to 1864; retired to his home near Montrose (1864-1877); pastor at Friendsville, Pennsylvania (1877-1881); lecturer on Christian Evidences at the Episcopal Theological Seminary from this year until his death, Dec. 9, 1885. Defective hearing secluded Dr. Mulford from very active life, and his heart was sore over the ravages of the Civil War. His meditations were profound, and he sought to find the divinest philosophical sanctions for the state. His contribution to that end was a remarkably analytical, elevated and exhaustive book, *The Nation: The Foundation of Civil Order and Political Life in the United States* (1870; new ed., 1876). To this he added *The Republic of God* (1881), a learned and acute effort to relate Christian dogma to philosophical thought. Mr. Mulford was a broad-churchman, steeped with German thoroughness and dialectic, and full of generous ardor. Although his style is involved and compact, his books are a treasury of suggestion and learning in the interests of a sounder and larger political and Christian life.

MULHALL, MICHAEL G., a British statistician; born in 1836, in Dublin, Ireland. He was educated in Rome, at the Irish College. He went to South America, and in 1861 founded the *Daily Standard* at Buenos Ayres, the first English daily on that continent. He was elected a member of the British Association and other honorary societies. He published *The Progress of the World* (1880); *Dictionary of Statistics* (1886-1892); and contributed to the *Contemporary Review*.

MULLEIN, the common name of species of *Verbascum*, an Old World genus of *Scrophulariaceæ* or figworts. The most common species is *V. Thapsus*, which grows as a weed everywhere, and is clothed with a dense felt-like covering of white wool and bears a long dense spike of yellow flowers.

MÜLLER, BARON FERDINAND VON, a German botanist and explorer; born in Rostock, Germany, June 30, 1825. He went to Australia in 1847 for the benefit of his health. Previous to his emigration he made an investigation of the vegetation of his native land. He spent the years 1848-52 in botanical exploration in Australia; in 1852 became botanist for Victoria, and during the next five years explored the northern part of Australia. He was appointed director of the Melbourne Botanical Garden in 1857, and remained in office until 1873, during which time he established the garden, now one of the finest in the world. He published *Fragmenta Phytographiæ Australiæ* (1862-77); *Plants of Victoria* (1865); *Flora Australiensis*; and other botanical works. He was knighted in 1870 by the King of Würtemberg.

MÜLLER, FRIEDRICH, a Bohemian philologist; born in Jemnik, Bohemia, March 5, 1834. He studied at Vienna, where in 1869 he was appointed professor of comparative philology. He was the editor of the journal *Wiener Zeitschrift für die Kunde des Morgenlandes*, and the author of *Elements of Philology* (1888); *Ethnography of the World* (1873); and essays on African, Asiatic and American languages.

MÜLLER, GEORGE, a British philanthropist, founder of the Orphan Homes, Bristol, England; born near Halberstadt, Prussia, Sept. 27, 1805. He went to Halle as a student of divinity. Through Tholuck's advice he went to London in 1829, and studied Hebrew and Chaldee with the view of becoming a missionary among Hebrews; settled at Teignmouth as minister of Ebenezer Chapel. In 1835 he printed proposals for the establishment of an orphan house, which took shape in 1836 at Bristol. In 1856 he announced that he had received \$422,205 on behalf of the orphans, who then numbered 297. By 1875 upward of 2,000 children were lodged, fed and educated. In 1889 it was announced that the orphan homes and associated enterprises cost about \$180,000 annually, voluntary subscriptions on the part of the public.

MÜLLER, MAX. See MAX-MÜLLER, in these Supplements.

MÜLLER, WILHELM, a German poet, father of Max-Müller; born in Dessau, Germany, Oct. 7, 1794. He studied at Berlin, and took part in the war of 1813-14 against Napoleon. He was appointed librarian of the Dessau gymnasium in 1819, and continued in the position until his death. He was the author of *Songs of the Greeks* (1824); *Poems from the Posthumous Papers of a Traveling Bugler* (1827); *Lyric Walks* (1827); and *Miscellaneous Papers* (1830). His songs are valued highly in Germany, and many of them have been set to music. He died in Dessau, Sept. 30, 1827.

MÜLLER, WOLFGANG, a German poet; born in Königswinter, Prussia, March 5, 1816. He was a

medical student at Berlin and Bonn. His poem *The May Queen* (1852) is perhaps the best known of his efforts. Others of his works are *Stories of the Rhine* (1874); *Prince Minnewein* (1854); *John of Werth* (1858); and a number of dramas. He died June 29, 1873.

MÜLLER'S GLASS OR HYALITE, a variety of opal. See MINERALOGY, Vol. XVI, p. 390.

MULLIONS. See ARCHITECTURE, Vol. II, p. 468.

MULOCK, DINAH MARIA. See CRAIK, DINAH MARIA MULOCK, in these Supplements.

MULTATULLI, pseudonym. See DEKKER, EDWARD DOUWES, in these Supplements.

MULTIPLE OF ELECTRIC UNIT. See ELECTRICITY, Vol. VIII, p. 19.

MÜNCH-BELLINGHAUSEN, ELIGIUS FRANZ JOSEPH, a German dramatist; born in Cracow, Austria, April 2, 1806. He was best known under his pseudonym Friedrich Halm, and from 1845 until his death was librarian of the Imperial Library at Vienna. Among his works are *Griseldis* (1835); *The King and the Peasant* (1841); *The Son of the Wilderness* (1842); and *The Gladiator of Ravenna* (1857). He was a dramatist of great power by reason of his choice of striking subjects and the disposition of his characters. He died in Vienna, May 22, 1871.

MUNCIE, a city of Indiana. It has a city hall, court-house, public library, good railroad facilities, two national banks, the largest flour-bagging factory in the United States, and some minor manufactures. Population 1890, 11,345. See also MUNCIE, Vol. XVII, p. 23.

MUNDT, KLARA MÜLLER, pseudonym LOUISE MÜHLBACH, a German novelist; born in Neubrandenburg, Germany, Jan. 2, 1814. She was married in 1839 to Theodore Mundt, librarian of the University of Berlin. Mrs. Mundt was the author of a large number of light novels, very popular among certain classes. Her subjects were mainly historical. The best known of her novels is *Frederick the Great and His Court* (1853). She died in Berlin, Sept. 26, 1873.

MUNGER, THEODORE THORNTON, an American clergyman; born in Bainbridge, New York, March 5, 1830. After his graduation from Yale in 1851 and four years spent in theological study, he entered the ministry of the Congregational Church and was stationed at Lawrence and elsewhere in Massachusetts until 1875, when he went to California. Returning to the East, he was chosen pastor at New Haven, Connecticut. He published *On the Threshold* (1881); *Lamps and Paths* (1885); and other works.

MUNGOOS, MONGOOS. OR MONGOOSE. See ICHNEUMON, Vol. XII, p. 629.

MUNICIPAL LAW means that system of law which a single nation, state or community establishes for the government of its people. Municipal law is generally treated under the subjects criminal law, civil law, military law, and the various subdivisions into which these general subjects are divided. It is distinguished from international law in that the latter is the system of rules established for the purpose of controlling the acts of all civilized nations to a cer-

tain extent, while municipal law is distinctively the law of one nation or state, and is meant to affect only its own citizens or those within its territory. In any one nation the municipal law of another nation or state is foreign law. See LAW, Vol. XIV, p. 354, and the various branches, such as *Constitutional*, *Criminal* and *Civil* law.

MUNJEET OR MUNJIT. See MADDER, Vol. XV, p. 176.

MUNK, SALOMON, a French-Jewish historian and Orientalist; born in Glogau, Germany, May 14, 1805. Although blind, he attained a high rank among scholars of his time, and was appointed professor of Hebrew in the College of France. He was active in the interests of his race. He was the author of *Reflections on the Culture of the Ancient Hebrews* (1833); *Palestine* (1845); a translation of Moses ben Maimon's *Guide of the Perplexed* (1866); and other works. He died Feb. 6, 1867.

MUNKACS, a market town of Hungary, situated at the foot of the Carpathians, 101 miles N.E. of Debreczin. It has mines of iron and rock crystals, called Hungarian diamonds. The citadel, built on an isolated height, resisted the imperial arms for three years (1685-88). Subsequently (1848) it fell into the hands of the Hungarians, and was captured by the Russians in the following year. It is now a state prison. Population, 9,601.

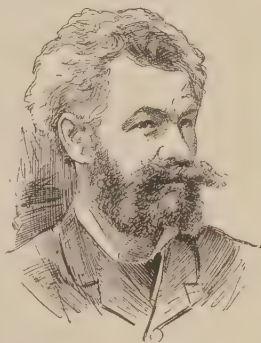
MUNKACSY, MIHALY, a Hungarian painter, whose real name was Michael Lieb, was born at Munkacs, Hungary, Oct.

10, 1846. He went as a turner's apprentice to Vienna; studied painting there, at Munich and at Düsseldorf, and in 1872 settled in Paris. Except a few portraits, his works are nearly all genre pictures. Three classes may be distinguished — those depicting Hungarian life, mostly very dark in coloring; those illustrative of the social life of Paris, much lighter and brighter in tone; and historical pieces,

of which the best-known example is *Christ Before Pilate*. Among his works are *The Interior of a Studio* (1876); *The Village Hero, Hungary* (1875); *The Night Prowlers* (1874); *The Last Day of a Man Condemned to Death* (1867); and *Christ on Calvary*.

MUÑOZ, JUAN BAUTISTA, a Spanish historian; born near Valencia, 1745. He was the author of the best history extant of the Spanish Indies, called *History of the New World*. He was given free use of all the archives of Spain, and was requested by the King to write a history of America from the discovery. He began work in 1779, and in 1793 issued the first volume, but did not finish the task. He died in Madrid in 1799.

MÜNSTERBERG, HUGO, a German psychologist; born in Dantzig, June 1, 1863. He studied at Leipsic, Heidelberg, Geneva and Dantzig; was assistant professor of psychology at Freiburg from



MIHALY MUNKACSY.

1887 to 1892; and in 1892 was appointed professor of experimental psychology in Harvard University, Massachusetts. He was the author of a number of psychological articles; among them, *Thought Transference* (1889); *The Origin of Morality* (1889); and *Problems and Methods of Psychology* (1891).

MUNTANER, R., a Catalonian chronicler. See SPAIN, Vol. XXII, pp. 363, 364.

MUNTZ'S METAL. See COPPER, Vol. VI, pp. 350, 351.

MUNYCHIA, a hill and harbor of Athens (q.v., Vol. III, p. 4). Also name of an annual festival. See ARTEMIS, Vol. II, p. 643.

MUR, river. See ALPS, Vol. I, pp. 621-630.

MURAD, sultans of Turkey. See AMURATH, Vol. I, pp. 781, 782.

MURAL CIRCLE, an astronomical instrument for the observation of celestial bodies at their meridian passage. It consists of a large metal circle, turning on an axis the end of which projects from a solid stone pier or wall (whence the name), close to which the circle moves. The plane of the circle is set as nearly as possible in the meridian. Fixed immovably to the circle is a telescope, which by turning the circle is made to point to the star to be observed at the time of its meridian passage. Two wires, one fixed and one movable, similar to those in the transit circle, enable the altitude or zenith distance of the star to be noted, if the instrument has been adjusted properly and if the zenith or horizontal point on the circle be known. See GRADUATION, Vol. XI, p. 515.

MURAVIEFF, a Russian family whose members have been prominent in Russian history since 1450. Of this family there are ten who are worthy of mention: (1) MICHAEL (1757-1807), littérateur; curator of the University of Moscow, state secretary and tutor of the royal children; a favorite of Catherine II, and the author of *Inhabitants of the Suburbs; Essay on Literature and Morals*; and other works.—(2) NICOLAS (1720[?]-1770), a mathematician, author of the first Russian algebra, and general in the army.—(3) NICOLAS NICOLAËVITCH (1768-1840), son of (2); soldier; established the national school for officers, and was one of the army leaders in the 1812-15 Russo-French campaigns.—(4) ALEXANDER (1792-1864), son of (3); was sentenced to Siberia in 1825 for nihilism, but pardoned later; afterward took part in the Crimean war.—(5) KARSKI, NICOLAS (1793-1856), son of (3); soldier; took part in French (1812-15) campaigns, Persian (1827), Russo-Turkish (1828-29), Crimean (1855). He captured Kars, hence the name Karski, "Prince of Kars."—(6) MICHAEL (1796-1866), son of (3); soldier; governor of Grodno in 1830, and during his term of office promoted the agricultural industry, but was accused of severity in his dealings with the subjects in the Polish insurrection of 1863 and the students' rebellion of 1861.—(7) AMURSKI, NICOLAS NICOLAËVITCH (1810-1881), son of (3); soldier and diplomat; governor of Siberia in 1847; brought about commercial relations with Japan and subdued the Amur territory, hence his title Amurski.—(8) ANDREW (1798-1874), son of (3); historian; his works include *Pilgrimage to the Holy Places of Russia*

(1832); *First Four Centuries of Christianity* (1842); and *Souvenirs of the East* (1851).—(9) MURAVIEFF-APOSTOL, IVAN (1769-1851), diplomat; Russian ambassador to Spain and Saxony.—(10) SERGIUS IVANOVITCH, son of (9); leader of the conspiracy of 1825; was hanged.

MUREX, a genus of gastropod mollusks typical of the family *Muricidae*. They are characterized by a shell covered with spines. Some species injure oyster-beds. In distribution the genus is cosmopolitan. There are numerous living and fossil species. The famous Tyrian royal purple dye was prepared from a secretion of one species of *Murex*. See MOLLUSCA, Vol. XVI, pp. 649, 650.

MUREXIDE, a substance once used as a dye, and from its color called for the *Murex* or purple-fish. Its chemical formula is $C^6H^4(NH^4)N^3O^6$, and it is an ammonium salt of purpuric acid. Prout described it as a purpurate of ammonium. It may be formed by gently heating uric acid and nitric acid together, evaporating the solution and adding ammonia to the residue. Murexide crystallizes in quadrangular prisms, diaphanously red, green by reflected light; dissolved in water, a rich purple is obtained. This substance has ceased to be of commercial importance, being superseded by aniline dyes.

MURFREE, MARY NOAILLES, pseudonym CHARLES EGBERT CRADDOCK, an American novelist; born in Grantlands, Tennessee, about 1850. After the Civil War she went with the family to St. Louis, Missouri, and there began the stories of Tennessee mountain-life which have become popular throughout the United States. These stories, at first published in serial form in the *Atlantic Monthly*, are included in bound form in *In the Tennessee Mountains* (1884); *Where the Battle was Fought* (1884); *The Prophet of the Great Smoky Mountains* (1885); *In the Stranger People's Country* (1891); *His Vanished Star* (1894); and *The Mystery of Witchface Mountain* (1895).



MARY N. MURFREE.

MURFREESBORO, a city and the capital of Rutherford County, Middle Tennessee, 30 miles S.E. of Nashville; on the Nashville, Chattanooga and St. Louis railroad; from 1819 to 1826, capital of the state. It has several mills and factories, the principal of which is one for cedar hollow-ware.

MURFREESBORO, BATTLE OF, Murfreesboro, Tennessee (q.v.), was the scene of three encounters during the Civil War. The first of these was slight and of little import. The town was occupied by a force of 1,400 Federal troops under Crittenden, who were attacked suddenly by the Confederate cavalry under Forrest and were driven out. The only benefit to the Confederates was the capture of a quantity of supplies. The second, and that which is generally known as the

Battle of Murfreesboro, was fought Dec. 31, 1862, and Jan. 1 and 2, 1863, between the Federals under Rosecrans and the Confederates under Bragg. Rosecrans had 43,000 men and Bragg about 62,000. Both armies, it was thought, had gone into winter quarters, when Bragg was surprised to find that Rosecrans had advanced from Nashville and hurriedly concentrated his force near Murfreesboro, on Stone River. The right wing of the Confederates was commanded by Breckenridge, the left by Hardee, and the center by Polk. The Federal left was under Crittenden, the right under McCook and the center under Thomas. Each hastened to attack, hoping to surprise the other. Bragg, however, made the first assault, driving the Federal left across the river, and was stopped only by the heavy battery fire from Sheridan's artillery. Sheridan, too, was obliged to retreat. Rosecrans gathered his forces on higher ground and there made a successful stand. During the next two days, storms prevented serious fighting, and Bragg retired January 4th. The losses to the Federals in killed, wounded and missing were about thirteen thousand; to the Confederates, about ten thousand.

The third encounter occurred near Murfreesboro June 23-30, when Rosecrans drove Bragg from an entrenched position on the Duck River.

MURIATIC, same as HYDRO-CHLORIC ACID. See CHLORINE, Vol. V, p. 678.

MURIDÆ, a family of rodents. See MAMMALIA, Vol. XV, pp. 418, 419.

MURPHY BUTTON. See SURGERY, AMERICAN, in these Supplements.

MURPHYSBORO, a city and the capital of Jackson County, southern Illinois, 50 miles N. of Cairo, on the Mobile and Ohio, the Chicago and Texas and the St. Louis, Alton and Terre Haute railroads, on Big Muddy River, 15 miles E. of the Mississippi River. It is in a rich bituminous coal-field, has quarries of fine building-limestone and manufactories of flour, fire-brick, lumber, ice, mineral waters and cigars. Population 1890, 3,880.

MURRAY, ALEXANDER, a Scotch philologist; born in Dunkitterick, Kirkcudbright, Oct. 22, 1775. When engaged as a shepherd he acquired, besides a scholarly knowledge of English literature, a mastery of the classics, all the principal European tongues, and Hebrew. The fame of the learned shepherd led to an invitation to Edinburgh, where he obtained a bursary, gave private lessons and continued his linguistic labors, which were extended to Oriental tongues and ancient and modern Abyssinian. In 1806 he became minister of Urr, and in 1812 professor of Oriental languages in Edinburgh University. Among his publications are *Oriental Philology: The Grammatical Principles of the Hebrew, Syrian and Other Languages* (1812); and an addition of *Travels in Abyssinia*, by Bruce (1807). He died in Edinburgh, April 15, 1813.

MURRAY, ALEXANDER STUART, a British archæologist; born in 1841, in Edinburgh; educated in the University of Edinburgh and the University of Berlin. He was connected, officially, with the British Museum after 1867, first as assistant and after 1886

as keeper. He was a constant contributor to periodicals and journals upon archæological subjects. His best-known works are *History of Greek Sculpture* (1883); and *Handbook of Greek Archæology* (1892). He contributed a number of articles to this *ENCYCLOPÆDIA*, among them *ACHILLES*, *ARCHÆOLOGY* and *GEMS*.

MURRAY, DAVID, an American educator; born in Delhi, New York, Oct. 15, 1829. After his graduation from Union College in 1852 he was principal of Albany Academy (1853-63); professor of mathematics in Rutgers College (1863-73); in the service of the Japanese department of education (1873-78); and from 1878 to 1888 secretary of the regents of the University of the State of New York. He published *Manual of Land Surveying* (1872); *Outline History of Japanese Education* (1876); and *The Story of Japan* (1894).

MURRAY, DAVID CHRISTIE, an English novelist; born in West Bromwich, April 13, 1847. He served as reporter and then as war correspondent for the *Scotsman* and *Times* in the Russo-Turkish War. In 1879 he published *A Life's Atonement in Chambers's Journal*. Other works are *By the Gate of the Sea* (1882); *A Dangerous Catspaw* (1889); *Bob Martin's Little Girl* (1892); *A Wasted Crime* (1893); *The Making of a Novelist* (1894); *The Martyred Fool* (1895).

MURRAY, JAMES AUGUSTUS HENRY, an English philologist; born in Denholm, Scotland, in 1837. He received his elementary education at Minto school, and afterward graduated from London University; removed to Hawick and was appointed assistant teacher in the parish school there, and afterward master of a subscription academy. He next removed to London, filling the post of foreign correspondent in the Oriental bank for some years; he afterward became senior assistant master at Mill Hill school. The great work of his life, the editorship of the Philological Society's *New English Dictionary*, was begun while at Mill Hill, an iron building in his garden there being utilized for the assortment of the two tons of material to which he fell heir from his predecessors in the editorship, Herbert Coleridge and Dr. Furnivall. This work has been continued at Oxford, where Dr. Murray, with a staff of assistants, has devoted his whole attention to the task. Among his writings are *The Complaynt of Scotland* (1872); *The Dialect of the Southern Counties of Scotland* (1873); and the *Romance and Prophecies of Thomas of Erildoune* (1875). He is also the author of the article on the *ENGLISH LANGUAGE*, in this *ENCYCLOPÆDIA*.

MURRAY, JOHN, a British naturalist; born in Coburg, Canada, in 1849. He was graduated from the University of Edinburgh, and on account of his studies in marine history was appointed geologist to the "Challenger expedition" under Sir Wyville Thomson. He was scientist in charge of the *Triton* and *Knight Errant* explorations in the North Atlantic deep seas. He contributed to various science journals; but his main publications have been in the reports of his deep-sea explorations. See *GEOLOGY*, Vol. X, pp. 288, 289; and *PACIFIC OCEAN*, Vol. XVIII, p. 288. He is the author of

the articles on NORTH SEA, PACIFIC OCEAN and NORWEGIAN SEA, in this ENCYCLOPÆDIA.

MURRAY, LINDLEY, an American grammarian; born in Swatara, Lancaster County, Pennsylvania, April 22, 1745. He was educated at a school in Philadelphia belonging to the Society of Friends. On his father's removal to New York he was placed in a counting-house, but his thirst for study was so ardent that he escaped to a school in New Jersey. He was admitted to the bar at the age of 21, and commenced a good practice. During the Revolutionary War he engaged in mercantile pursuits with such success as to accumulate a fortune. In 1784 he went to England and purchased the estate of Holdgate, near York, where he devoted himself to literary pursuits. In 1787 he published his *Power of Religion on the Mind*, which passed through nineteen editions and was translated into French. His *Grammar of the English Language* was issued in 1795. Murray's Grammar was for half a century the standard text-book throughout Britain and America. He died at Holdgate, Feb. 16, 1826.

MURRAY BAY, a picturesque watering-place in Charlevoix County, Quebec, on the St. Lawrence River, 90 miles E. of Quebec. It has lumber-mills. Population of parish in 1891, 3,303.

MURSKA, ILMA DE, a Bohemian opera-singer; born in Buda-Pesth, Hungary, in 1836. She was trained in Paris by Madame Marchesi; first sang in public in Florence, Italy, in 1862, and appeared in London in May, 1865, as Lucia in *Lucia di Lammermoor*. In 1873 she sang in opera in New York, and her last appearance in the United States was in 1887. She was married in 1875 to Alfred Anderson, and again in 1876 to T. J. Hill. Her voice was a soprano, and her best representation Senta in the *Ollandese Dannato*. She died in Munich, Bavaria, Jan. 14, 1889.

MUSCADINE GRAPE, the *Vitis vulpina* of the southern United States, where it is also known as bullace or fox-grape. Its fruit is large, purple, thick-skinned and musky, and is the original of the Scuppernong grape and other cultivated varieties.

MUSCATINE, the capital of Muscatine County, in the state of Iowa. It is on the Chicago, Rock Island and Pacific and the Burlington, Cedar Rapids and Northern railroads. Its finest buildings include the Commercial Club building and the Young Men's Christian Association. Its manufactories include, besides those already mentioned, saw-mills, sash, door and blind factories, iron rolling-mills, oatmeal-mill, box factory, plumbing-supply factory, woven-wire picket-fence factory, brick and tile works, iron foundries, marble-works, pearl-button works, machine-shops, cigar factories, carriage, harness and wagon factories and pickling-works. Population 1890, 11,454. See MUSCATINE, Vol. XVII, p. 65.

MUSCLE. See ANATOMY, Vol. I, pp. 833-842.

MUSCLE-SUGAR. See INOSITE, in these Supplements.

MUSCOGEE or CREEK INDIANS. See INDIANS, Vol. XII, p. 831.

MUSCOVITE. See MINERALOGY, Vol. XVI, p. 413.

MUSCULAR-SENSE. See TOUCH, Vol. XXIII, pp. 482, 483.

MUSEUM (Gr., *mousetion*), originally the name given by the ancients to a temple of the Muses and afterward to a building devoted to science, learning and the fine arts. The first museum of this kind was the celebrated Alexandrian Museum, a meeting-place for learned men, and a library, founded about 280 B. C., in the palace. After the revival of learning in Europe the term museum came to be applied to collections of antiquities and sculptures and paintings. Collections illustrative of natural history and other sciences now form a chief part of the treasures of many of the greatest museums, and there are museums devoted to particular branches of science, and to illustrating the industrial arts. The British Museum and that of South Kensington in London, the museums of the Vatican in Rome, of the Louvre in Paris, of St. Petersburg, Dresden, Vienna, Munich and Berlin, Boston Museum of Fine Arts, and the National Museum at Washington, are among the greatest in the world. For art galleries, see SCHOOLS OF PAINTING, Vol. XXI, pp. 444-447; see also BRITISH MUSEUM and NATIONAL MUSEUM, in these Supplements.)

MUSICAL SIGNS. See MUSIC, Vol. XVII, pp. 80-82.

*MUSIC IN AMERICA. While it is true that America has not yet produced a great American composer, it has, nevertheless, a copious and important musical history. Of the music of the American aborigines little need be said. The organization of Indian society by gentes and phratries afforded little opportunity for individual development, hence the emotional nature of man did not seek musical expression extensively. With the exception of some love-songs, which indicate the dawn of individuality—for instance, the Bethæ Wa-an and Wa-oo Wa-an of the Omahas—and show some development of tonality, the great bulk of American Indian music showed, like that of all primitive races, a strong preponderance of rhythm and but little tone, melody or harmony. But there was sufficient progress already to produce some vocal music without words; that is, songs which were chanted to mere vowel sounds, stripped of harsh consonant explosives, and used only to carry the tone, but having no meaning as words.

The distance between traditional European music which the colonists brought with them, and that of the Indian, was too great to allow any influence of the latter upon the former. American music is simply an importation or adaptation of the music of Europe.

Beginning in 1620, several distinct and well-defined epochs can be traced, each showing an advance over that which preceded. It is important to note that this rise for more than two hundred years made its way against the greatest obstacles. The cause and manner of its first development are of prime importance in arriving at a just comprehension of the present musical status of America.

PSALMODY. American music found its origin in psalmody, and the history of music from that time is but the history of struggles from nothing to the final establishment of choir-singing in 1790. Psalm-singing was an integral and important part of Puritan worship methods. At first, rude recitatives replaced the old and forgotten tunes, and slowly a new set of tunes began to take their place. After a time rude music was introduced, consisting merely of a succession of notes undivided by bars. A century passed before music, in anything approaching its modern acceptation, made its appearance. In 1721 the first music printed with bars appeared. This was *The Grounds of Music Explained; or, An Introduction to the Art of Singing by Note. Fitted to the Meanest Capacity.* By Rev. Thomas Waller, of Roxbury, Massachusetts. By this time psalmody had taken firm root, and the growth of it is to be traced plainly to the present day. While music was in this crude state in America, Monteverde in Italy was originating opera; in England Purcell was re-establishing the nearly lost and grand old art of church-music; in Germany Haydn and Mozart were filling the land with melody, and Handel and Bach had already done their work. But it must be remembered that in the Old World progress was being made from long-established foundations and in many lines, while in the New everything had to be originated, and not only that, but along a single, narrow path sternly limited by harsh theological restrictions. Even at this time such books as that of Dr. Waller were intended for the voice alone, and instrumental music was looked upon as a satanic device.

Still we find Edward Bromfield, Jr., building the first organ as early as 1742 in Boston, and in 1773 we hear of Josiah Flagg as leading a band. Flagg was composer, publisher, performer, manager and leader. He gave a series of performances in Faneuil Hall, at one of which he had as many as fifty performers.

With William Billings began actual musical progress. Billings was the first original composer of America, and the pioneer of a new era of advance. He was born in Boston, in 1746, and died in 1800. He was a tanner by trade, and attending the singing-schools which at that time were flourishing, became restless and dissatisfied with the existing music. He found it stiff and formal, and sought to expand it by giving expression to what he called "spontaneous melody." He was entirely self-educated, and made his own unaided attempts at contrapuntal writing. It is told of him that his first compositions were written on the sides of leather in his tannery with a piece of chalk. In 1770 he published his first book, *The New England Psalm Singer or American Chorister*. Crude and faulty as these compositions undoubtedly were, they nevertheless marked a distinct advance of an original type. Then came the War of the Revolution, and with it a new development in music. Intense hatred of everything British sprang up, precisely as a similar hatred had actuated the early Puritans, and with the tea

the old British psalm-tunes were pitched overboard. Billings now began to write paraphrases of the psalms into politico-patriotic hymns, which were instantly taken up by the people. One of the best and best-known of these, *Chester*, was often heard played on the fifes as the Revolutionary troops went into battle. These songs and hymns were essentially the first American folk-songs. They possess especial characteristics of virility and originality. They broke down the narrow barriers which thus far had confined musical advance, and laid foundations for progress along many lines. Billings was not alone in this work. Contemporary with him or immediately following him are found Andrew Law, Jacob Kimball, Oliver Holden, Samuel Holyoke, Daniel Read, Timothy Swan, Jacob French, Oliver Shaw, Babcock, Dutton, Lee, King and many others.

REACTION. With the dawn of the nineteenth century a reaction began to be strongly felt. The old singing-schools had developed into musical societies, and there are extant accounts of essays delivered before the Handel Society of Dartmouth College, which assail the then prevailing style of church-music and demand music free from the extravagances which, not unnaturally, characterized the work of Billings and his school. Progress up to 1820 was fairly steady. In that year we find E. Riley publishing in New York, *Vocal Melodies, Arranged for the Piano*; and in Kentucky A. C. Heinrich published *The Dawn of Music*. Outside of New England, where American music was born, some advance, meanwhile, was being made. In 1750 *The Beggars' Opera* had been performed in New York, and for some years after the War of the Revolution English opera had a fitful existence in New York and Philadelphia, and also, to a less extent, in Baltimore and Charleston. There was a revival of interest in 1793-94. In 1810 Charles Geifert, leader of the Park Theater orchestra, attained some prominence as a composer of music for plays. It was in New England, however, that the characteristic advance was made. As Billings had broken away from the conditions about him and given a new direction to musical effort, so now a second original American musician and composer appeared. Lowell Mason was born in Medfield, Massachusetts, in 1792, and died in 1872, having lived to witness the growth and success of his earliest efforts. In 1822 he published his first book of church-music as *The Boston Handel and Haydn Society Collection of Music*. In 1826 he began lecturing on music and developing his great central idea, which was the necessity for the diffusion of true musical knowledge among the people by the teaching of music in the public schools. The old Puritan spirit was still alive, and he met with opposition. In 1836 the Boston School Board voted in favor of his proposition, but the board stopped there and refused to make an appropriation to carry out the plan. Mason at once offered to pay all the expenses for one year, and did so. The result was such that thereafter the teaching of music became an important part of the public-school education.

Then Mason developed a plan of conventions or gatherings of teachers, then of the professors, and, finally, established the great conventions, which have ever since done so much toward forwarding the progress of music. To him, too, is fairly due the introduction of serious chorus-work. As has been said, the earliest operatic representation was that of John Gay's *The Beggars' Opera*, in New York, in 1750. In 1823 was produced a distinctively American opera, one melody of which is known wherever music itself is known. In that year John Howard Payne's dramatic opera, *Clari, the Maid of Milan*, was produced. In it is found *Home, Sweet Home*.

In 1827 an effort was made to produce *Der Freischütz*. It was rendered imperfectly. In the same year Manuel Garcia brought Italian opera to New York. He made a success, and this encouraged Da Ponte to build an opera-house. The result was disastrous. The season of eight months yielded receipts of \$29,275, with expenditures of \$81,055.

ORATORIO. Better progress was made along this line, which was the more natural sequence to the old psalmody and church-music. In 1798 Gottlieb Graupner settled in Boston, and Trajetta came to New York the year following. In 1810 Graupner organized a Philharmonic Society, which was in existence for twelve years, and which was the beginning of orchestral music in America, and paved the way to oratorio. March 30, 1815, Graupner, Thomas Smith and Asa Peabody organized the Boston Handel and Haydn Society, which afterward, by taking up Lowell Mason's work and assisting him, really opened the way to the successful development of American music. On Christmas of 1815 that society gave its first "grand oratorio," with the Russian consul, Eustaphieve, among the performers. The audience numbered 945. There were 100 voices in the chorus and less than a dozen instruments in the orchestra. Selections from Handel's *The Creation* and *The Messiah* made up the programme. In 1823 it presented *The Messiah* complete. This same year saw the real beginning of classical sacred music in New York in the foundation of the Choral Society.

DAWN OF MODERN EPOCH. The dividing date is 1840. It is now difficult to follow out the separate lines of progress. Lowell Mason's work was bearing rich fruitage already. There was a distinct musical spirit among the masses as its result, and development was correspondingly rapid. In 1843 Palmo built a new Italian opera-house in New York, which, by 1847, was too small, and, four years later, Foster, Morgan and Colles built an opera-house in Astor Place. There were 150 subscribers to 75 nights of opera a year for five years. The opening presentation was *Ernani*, and the five years resulted in a great financial success. So great was it that, in 1853, the building of the Academy of Music was begun. It cost \$350,000, and was opened in 1858. It professedly was to be an academy for the promotion of the study of music and the encouragement of

original thought by the study of Italian opera. It was a failure from the outset. The reasons are not far to seek, and are well expressed by W. S. B. Mathews, to whose *Hundred Years of Music in America* this article is indebted. He says: "Italian opera is not adapted to flourish in this country. It is a mistake, we apprehend, to suppose, as some assume, that our people are musically incompetent to appreciate the higher forms of art. The sterling and substantial progress of oratorio, for instance, and of English opera, proves the contrary. The difficulty is to be looked for in the fact that the genius and instinct of our people are wholly at variance with that on which Italian opera is based, nor is it at all possible to assimilate our art education to an appreciation of such features of Italian opera as are little short of repugnant to our tastes and sensibilities. The success of Italian opera must, therefore, always remain of a transitory nature. It is based rather upon sensual or intellectual appreciation than upon spiritual grounds."

The Academy did try to develop distinctively American music. In 1855 Ole Bull was the lessee and manager, and offered a prize of \$1,000 for "the best original grand opera by an American composer upon a strictly American subject." But the Academy failed the year following. Max Maretzek then continued Italian opera in a desultory way.

The year 1856 is to be noted for an eminently successful season of German opera. In 1853 Jullien came from New Orleans with his spectacular orchestra. With him were many musicians who afterward made their mark in American musical history. Jullien heartily encouraged American composers, and frequently produced original works. Among the most important during his New York season were compositions, among others, by H. W. Fry and T. Bristow. Jullien's orchestra comprised sixty performers. At this same time Barnum was presenting Jenny Lind to the American public.

The next important epoch was that of the Civil War. Then the true American folk-songs sprang into full existence. Both North and South contributed to these. These compositions were not martial only in tone, but covered the whole field of the mournful, the sentimental, etc. Francis Scott Key's *Star-Spangled Banner*, written in 1814, took new life, and Henry Clay Work produced *Marching Through Georgia*. There was a great trio at work at this time: Lowell Mason, William B. Bradbury and Dr. George F. Root. Root's *Battle-Cry of Freedom* became as widely known as Work's great martial song.

Up to the opening of the war, Boston and New York were the centers of musical activity; but in 1865, when the war closed, this activity was transferred to Cincinnati and Chicago. Before examining this new phase, which might be called the modern epoch, it is necessary to go back a little and rapidly glance over the work of a number of important composers and the effect produced by virtuosi and the manufacture of instruments. Be-

longing to the *post-bellum* period really, although born in 1816 and dying in 1868, was William Batchelder Bradbury, who deserves to be known as the melodist among American psalmodists. His principal work is the sacred cantata, *Esther*, which has been presented innumerable times with unvarying success. His contemporary, Isaac B. Woodbury (1819-1858), should also be reckoned with him. Root and Work have been mentioned. Other workers in this field were Charles Carroll Sawyer, Luther Orlando Emerson and Horatio Richmond Palmer. Two American composers of this period emphasized and accentuated the old psalmic spirit, and won instant recognition from the American people. These were Philip Paul Bliss, author of *Hold the Fort*, *Pull for the Shore*, *Rescue the Perishing*, etc., and J. P. Webster, whose *Sweet By-and-By* was sung by millions. In connection with these compositions should be noted the instantaneous success of Stephen Collins Foster, author of *The Old Folks at Home*.

The effect of the perfection of the piano is a factor in the growth of American music that cannot be over-estimated. The appearance of Thalberg in 1855 may be said to have begun this influence, which was modified and strengthened by Gottschalk. Among the pioneers are Rubenstein, von Bülow, Mme. Essipoff, Mme. Rivé-King, Teresa Carreño and Joseffy. The perfection to which Chickering and the Steinways brought the piano, adding to its value as a means of interpreting music, assisted materially in the spread of musical spirit, appreciation and ability among the people. The recent triumphs of Pachman, of D'Albert, and yet more notably of Paderewski, show that these qualities are as fully alive in America as anywhere on the globe. In this connection the tremendous advance in organ-playing must be noted. As its most prominent exponent, Clarence Eddy's famous feat of giving a series of 100 organ recitals, extending over a period of two years, at which more than five hundred separate compositions, many of them of American origin, were presented without any duplication, had tremendous effect in advancing organ-playing.

Belonging partly to this epoch and partly to the modern one are the great choral societies of the country, which began their work about 1865, and have done more, perhaps, than any other one cause to make good music popular and arouse a desire for musical cultivation among the masses of the people. The Handel and Haydn Society of Boston began in 1867 to give triennial festivals. The North American Sängerbund, consisting of numerous German singing-societies scattered all over the United States, inaugurated biennial meetings with choral concerts. Great festivals were held in Cincinnati, Chicago, and other cities, notably the splendid Peace Jubilee and the May Festivals, the annual concerts of the Apollo Club of Chicago, etc. It is, perhaps, due to these societies more than to anything else that music has been introduced extensively in the curriculum of public schools.

MODERN EPOCH. Three names stand out brilliantly as those of the leaders, Thomas, Damrosch and Dvořák. Again it is necessary to retrace history a little. Theodore Thomas was the one who really opened the doors to the highest musical effort in America. In 1842 the New York Philharmonic Society was organized, and until 1866 it lived a precarious existence. In 1854 Theodore Thomas, with William Mason, Carl Bergmann, Theodore Matzka and Bernard Mollenhauer, began to give chamber concerts. In 1855 he inaugurated in New York a series of concerts in a garden near Central Park, and the following year at Central Park Garden. Thomas had in view the most important orchestral enterprise ever undertaken, and seized with avidity every opportunity of reaching the end which he had set before him. Thus we find him in 1864 organizing the first symphony orchestra. The Philharmonic Society from 1866 to 1876 was under the guidance of his associate, Carl Bergmann, who was followed by Doctor Leopold Damrosch. Theodore Thomas then began to guide its destinies. Anxious for the appearance of American music, he was persuaded to identify himself with Mrs. Thurber's unfortunate venture at so-called American opera. Within the last few years he has seen his highest hopes realized, and has brought together a perfect orchestra, competent to render the highest forms of music. He presented Wagner's *Ride of the Valkyries* and other important works of the same composer long before they were known to the general European public. He must not, however, be considered as a Wagner enthusiast, for he has also made known in the same way Berlioz, for example, and insists that Beethoven is to be placed as the head of all times and all schools in orchestral writing. He simply has recognized the dominant principle underlying American musical appreciation and due to its development.

His labors, so earnestly and sincerely carried on, opened fresh fields which soon were occupied. The Boston Symphony Orchestra was one of the first and best results. In 1875 Dr. Leopold Damrosch incorporated the Oratorio Society of New York, which he had organized two years before; and five years later, in 1878, he founded the New York Symphony Society. After Doctor Damrosch's death, in 1885, his son, Walter, assumed the work, and is now carrying it on most successfully. Ambitious efforts were made in the direction of producing grand opera, and they have of late been generally successful. The two great modern schools, arbitrarily called Italian and German opera, are represented in this country annually by two organizations composed of the greatest operatic artists that can be obtained, and second to no other aggregations of a similar character anywhere. However, the American public does not show enough taste for that class of performances to support such organizations permanently, as was instanced recently by the unsuccessful termination of the Metropolitan Opera-House enterprise of New York. The names most prominently connected with grand opera in the United States as

managers and conductors are Colonel Mapleson, Abbey, Schöfel and Grau, Leopold and Walter Damrosch, and Anton Seidl. Light opera and opera burlesque, on the other hand, find a rich field in America.

It is, perhaps, natural enough that there is not yet any characteristically American music. Even the national airs lack originality, and contain strong reminders of English and French motifs. An interesting, if not wholly successful, attempt to create a national style of music was made within the last few years by Antonín Dvořák, the Bohemian composer, whom the New York Philharmonic Society secured to take charge of its work. Dvořák considered the negro melody and harmony the most important element of an indigenous character as distinguished from the traditionary music of Europe, which had not been modified perceptibly in America. Upon that theory he composed a symphony, *In the New World*, not utilizing existing negro airs, but analyzing them and attempting to employ their elements in the construction of a new and ambitious work. In order to emphasize the American character of the work, he used Longfellow's *Hiawatha*, and attempted to reproduce its sentiment, not its story, in music. The result was a very beautiful piece of music, the second movement, which represents Hiawatha's journey through the primeval forests and his wooing of Minnehaha, being received with particular delight by the public. But candor compels the statement, that to the public not capable of analyzing and discovering scientifically the elements out of which the work was compounded, there was nothing in the music more suggestive of America than of any other country.

Two generations ago music in America was still in its infancy. To-day there are great colleges of music all through the country. Perhaps the most important of these are the New York Conservatory of Music, the Grand Conservatory of Music, the New York College of Music, the Metropolitan Conservatory of Music—all of New York; the Boston Conservatory of Music, the Chicago Musical College and the Chicago Conservatory of Music. One of the most surprising things to foreign musicians who visit the United States is the large number and earnestness of private musical study clubs that have sprung up everywhere. There are amateur orchestral associations of no mean ability. American singers have conquered places in the first rank of operatic performers. A peculiarity is that the popular topical songs produced in America are full of a native swing, although not characteristic in melody, which possibly points the direction in which national musical features will grow. Indications of local characteristics have appeared in the past and are occasionally found to-day, such as the quaint river melodies of the boatmen of some years ago. The work done, however, has been chiefly in preparation. Not that there has been a paucity of original composers, but that their attempts, for the most part, have been

undertaken with insufficient tools. These deficiencies the great orchestral leaders have been supplanting with splendid equipments that ought to lead to the "land of promise."

A partial list of musicians who have seriously advanced American music is presented rather as an indication for the student than as a complete roster of American composers:

Gottschalk, Louis Moreau—Most important works, *Mancenillier*; *Chasse de Jeune Henri*; *Songe d'une Nuit d'Été*, and *Moissoneuse Mazurka* (1847); *Carnaval de Venise*; *Jerusalem*; *Chant du Soldat*; *Ricordati*; and *Valse Poétique* (1857); *Marche Solennelle*; *Minuit à Séville*; and *Reflets du Passé* (1858); *Manchega*; *Souvenir de la Havane*; *Ardennes*; *Jeunesse Mazurka*; *La Chute des Feuilles* (1860); *Polonia*; *Caprice*, *O Ma Charmante*; *Caprice*, *Suis Moi*; and *Berceuse* (1861); *La Colombe*; *Ojos Criollos*; *Misérère du Trovatore*; *Reponds-moi*; *Overture to William Tell* (1864).

Mason, William—Various compositions for pianoforte.

Foote, Arthur—Some important chamber and orchestral music, particularly; overture, *In the Mountains*, produced in London, England.

Fry, William Henry—Opera, *Leonore* (1845); *Nôtre Dame de Paris* (1864).

Paine, John Knowles—*Mass in D*, produced in Berlin with great success (1861); oratorio, *St. Peter* (1873); music for *Edipus Tyrannus*, several symphonies, and *The Tempest* (1881).

Buck, Dudley—Two Mottette collections; church-music, cantata, *Don Munio*, *Forty-seventh Psalm* (1874); cantata, *The Nun of Nidaros* (1878); cantata, *King Olaf's Christmas* (1887); light opera, *Deseret*; oratorio, *The Golden Legend* (1880); oratorio, *The Light of Asia* (1886).

Other composers who lately have produced important musical works are Charles Crozat Converse, Dr. Frederic L. Ritter, Silas G. Pratt, Frank Van der Stucken, George W. Chadwick, Edward A. MacDowell, and Frederick G. Gleason.

H. E. O. HEINEMANN.

MUSKEG, the name given the swamps of northern Michigan, Wisconsin, Minnesota and British Columbia. These swamps are in some cases a peaty stratum, formed on the surface of a lake by the interlacing of vegetable drift with aquatic plants, on which, in process of time, shrubs and even trees grow, and which are capable sometimes of supporting the weight of a railway. In other parts the water takes the form of a lake, underneath which is a deep bog, and in some places the peaty mass forms the whole swamp with no water beneath. In the Muskeg grow stunted pines, and upon ridges, which separate one portion of the swamp from the other, are good timber-trees. The Muskegs are inhabited by the moose, especially in the summer months.

MUSKEGON, a city and capital of Muskegon County, in western central Michigan, on the Chicago and West Michigan, the Grand Rapids and Indiana and the Toledo, Saginaw and Muskegon railroads. In 1891 its water-works system

was completed; in 1888 the Hackley public library, containing 20,000 volumes, was founded. The census reports of 1890 show that 310 manufacturing establishments, representing 53 industries, reported. Its lumber trade still remains one of the largest industries of the city. Population 1890, 22,702; 1894, 20,222. See MUSKOGON, Vol. XVII, p. 108.

MUSKINGUM RIVER is formed in the center of Coshocton County, central eastern Ohio, by the union of the Licking and the Tuscarawas; at Marietta, after a course of 112 miles, it joins the Ohio River; is navigable for steamboats to Dresden, which is 95 miles up.

MUSKOKA RIVER, a river of northwestern Ontario, Canada, rises in Nipissing district and flows W.S.W. through Muskoka Lake into Georgian Bay.

MUSPRATT, JAMES SHERIDAN, a British chemist; born in Dublin, Ireland, March 8, 1821. In 1837 he was appointed chemist for an English manufacturing company, and afterward studied at Giessen, Germany. He is best known in the scientific world for his investigations in ethyl and his discoveries in organic chemistry. He published *Outlines of Qualitative Analysis* (1849); *Dictionary of Chemistry* (1854); and a translation of the *Blowpipe*, by Plattner (1844). He died in West Derby, England, Feb. 3, 1871.

MUSQUASH, same as MUSKRAT, Vol. XVII, p. 108.

MUSSAFIA, ADOLF, an Austrian philologist; born in Spalato, Dalmatia, Jan. 15, 1834. In 1852 he began the study of medicine in the University of Vienna, but soon turned his attention to philology. In 1860 he became professor of the Romance languages and literature in the University of Vienna, and in 1868 assistant librarian of the Imperial Library in Vienna. He published a *History of the Romance Languages* (1862); *Memoir of Ancient French Poetry in the Library of St. Mark at Venice* (1863); *Studies of the Legends of Mary of the Middle Ages* (1891); and treatises on kindred topics.

MUSSULMAN. See MOHAMMEDANISM, Vol. XVI, p. 545.

MUSTAFA. Four Sultans of TURKEY, q. v., Vol. XXIII, 646-652.

MUSTARD FAMILY. See CRUCIFERÆ, in these Supplements.

MUSTARD OIL. See OILS, Vol. XVII, p. 744.

MUSTELIDÆ. See MINK, Vol. XVI, p. 474.

MUT, an Egyptian goddess. See EGYPT, Vol. VII, p. 718.

MUTSU, HIRO, the Mikado of Japan; born at Kyoto, Nov. 3, 1852; succeeded to the throne Feb. 13, 1867. He did much to advance Japan toward a place among the highly-civilized nations of the world. He led in introducing reforms and in entering into commercial relations with the great nations of Europe and America. Under his rule a representative Parliament has been instituted.

MUTTON-BIRD. See SHEARWATER, Vol. XXI, pp. 781, 782.

MUTUAL COMPANIES. See FIRE INSURANCE, in these Supplements.

MUTUAL INDUCTION. See ELECTRICITY, § 71, in these Supplements.

MUZAFER ED-DIN, a Shah of Persia; born March 25, 1853. He was the second son of Shah Nasr ed-din (q. v., in these Supplements), who exercised the royal prerogative of leaving the crown to any member of his family he might select. The new Shah is the fifth sovereign of the Kajar dynasty, and a Turk by descent. This dynasty has ruled in Persia for over a century. During the reign of his father he lived a retired life, and was not well known to the representatives of the foreign powers. He was enthroned at Teheran, June 8, 1896, and received the recognition of the powers and the homage of the chief officials of his kingdom. He was a pacific prince, without the despotic tendencies of his father. His elder brother, Zil-es-Sultan, governor of the province of Ispahan, was of lower birth and had a considerable following in his own province, but sent immediate assurances of his loyalty to the new Shah. The mother of the latter was the royal wife of the late Shah. When Muzafer was proclaimed Vali Ahd, or heir presumptive, he was, according to custom, made governor of Azerbaijan. He had in his youth for his tutor Mirza Nizam, who had been one of the most brilliant pupils of the École Polytechnique and of the École des Mines, of Paris. His own children, of whom he had 4 sons and 15 daughters, are born of wives of low rank and cannot succeed to the throne.

MŮŽÁKOVÁ, JOHANNA, the wife of Professor Peter Můžák of Prague, and who is better known as Karolina Světlá, a Czech writer, born at Prague, Feb. 24, 1836, and published her first story in the almanac *Máj*. Among her better known novels are *Laska k Běšníkovi*, *Roman z Casů Novějších* (*Poet Love, Novel of the Present Time*) (1860); *Vesnický Roman* (*The Village Romance*) (1869); *Fratina* (1870); *Kříž a Potoka* (*The Cross near the Brook*) (1871). Many of her stories have been translated into other languages, and she is regarded as the leading representative of Czech literature of the present day.

MYCALE, a wooded promontory of ancient Ionia, over against Samos. In the channel between them Leotychides the Spartan and Xanthippus the Athenian defeated the Persian fleet, 479 B. C.

MYCERINUS, MENKURA, or MENCHERES, a king and pyramid-builder. See EGYPT, Vol. VII, pp. 732, 733, 772.

MYCODERM. See FERMENTATION, Vol. IX, pp. 97, 98.

MYCORHIZA, in botany a term applied to a remarkable case of symbiosis (q. v., in Supplements) which has been observed in certain plants, especially amentaceous trees and species of orchids and *Leguminosæ*. In these plants the absorbent region of the roots is covered by a felt-like growth of a fungus-mycelium, the structure being called *mycorhiza*. It is thought that this fungus aids in the absorption of organic material by the

roots, though the exact nature of the service rendered has not been demonstrated. Also, see *ECOLOGY*, in these Supplements.

MYER, ALBERT JAMES, a United States signal-service officer and meteorologist; born in Newburg, New York, Sept. 20, 1827. He graduated at Hobart College, and in 1854 entered the United States army as a surgeon. In 1860 he joined the signal-service corps, and served under General McClellan in all the battles from Bull Run to Antietam. In 1863 he took charge of the United States signal department; but his appointment was revoked in July, 1864. In July, 1866, he was reappointed, with rank as colonel, and in June, 1880, was promoted brigadier-general as a reward for the improvements which he had introduced in the signal-service. Under his administration the existing system of "weather probabilities" was inaugurated and perfected. He died in Buffalo, New York, Aug. 24, 1880.

MYERS, FREDERICK WILLIAM HENRY, a British writer; born in Veswick, England, Feb. 6, 1843; studied at Cambridge, Trinity College; and was from 1865 to 1868 lecturer there. He wrote *The Renewal of Youth, and Other Poems* (1882); *Essays, Modern and Classical* (1883); and *Science and a Future Life, with Other Essays* (1893). He was also a regular contributor to current journals, and for many years has been interested in the Society for Psychical Research, for which he jointly with others edited *Phantoms of the Living* (2 vols., 1886).

MYLIOBATIDÆ, a family of fishes. See *RAY*, Vol. XX, p. 300.

MYLITTA. See *MITHRAS*, Vol. XVI, p. 530.

MYOPIA. See *OPHTHALMOLOGY*, Vol. XVII, p. 785.

MYRMELEO. See *ANT*, Vol. II, p. 98.

MYRMIDONES. See *ÆACUS*, Vol. I, p. 179.

MYROBALAN, an East Indian fruit used in tanning. See *LEATHER*, Vol. XIV, p. 382.

MYRTACEÆ, a family of dicotyledonous plants, mostly with opposite leaves, which are entire, more or less leathery, evergreen and glandular-aromatic; regular four or five parted flowers, with numerous stamens; and fruit mostly a berry. It contains over two thousand species, confined almost entirely to the tropics, chiefly in America and Australia. Well-known genera are *Eugenia*, with species yielding cloves (flower-buds); *Eucalyptus*, well known on account of its rapid growth in swampy ground, which it helps to drain; *Pimenta*, yielding pimento and bay-rum; *Punica*, the pomegranate; *Bertholletia*, yielding the Brazil nut; *Psidium*, from which guava is obtained, etc.

MYTHO, a town of Cochin-China. See *SAIGON*, Vol. XXI, p. 152.

MYTILENE. See *LESBOS*, Vol. XIV, p. 474. and *AQUEDUCT OF*, see *AQUEDUCT*, Vol. II, p. 221.

MYTILACEÆ. See *MUSSEL*, Vol. XVII, p. 110.

MYXOMYCETES. See *FUNGUS*, Vol. IX, pp. 827, 835.

MYZOSTOMATA. See *PARASITISM*, Vol. XVIII, p. 259.

N

NABULUS—NANSEN

NABULUS. See **SHECHEM**, Vol. XXI, p. 783.

NACHTIGAL, **GUSTAV**, a German traveler; born in Eichstedt, Feb. 23, 1834. He studied medicine, and served as army surgeon until 1863, when he went to North Africa for his health. In 1868 he was selected to carry presents from the King of Prussia to the Sultan of Bornu. Starting from Tripoli in 1869, he traveled by way of Fezzan and Tibesti to Bornu, made excursions into the states of Borgu and Bagirmi, and returned home by way of Wadai, Dar-Fûr, Kordofan and Cairo, where he arrived in 1874. This journey—in the course of which he was the first European to visit the native states of Tibesti, Borgu and Wadai—put him in the front of modern travelers. The wealth of valuable information he acquired was transcribed in *Sahara und Sudan* (1879). In 1884 he was commissioned by Germany to annex Togoland, Cameroons and Lüderitzland (Angra Pequena) on the west coast of Africa. He died on the return journey, off Cape Palmas, April 10, 1885.

NACOGDOCHES, a village and the capital of Nacogdoches County, eastern Texas, 135 miles N. N. E. of Houston and 160 miles N. of Galveston; on the Houston, East and West Texas railroad; has three churches, a court-house and three newspapers; cotton, lumber and hides are the staples of the district. Population 1890, 1,138.

NADIR SHAH OR **KULI KHAN**, a Persian monarch. See **PERSIA**, Vol. XVIII, pp. 641-643.

NAGYBÁNYA, a town in the eastern portion of Hungary, 32 miles E. N. E. of Szathmar Némétri, near the Carpathian Mountains and the Transylvania frontier, on the Hungarian State railway. It is the center of a rich mine district, and is extensively engaged in the mining of gold and silver and in the manufacture of earthenware. Population, 8,732.

NAGY KÁRÓLY, a town of eastern Hungary, 17 miles S. W. of Szathmar Némétri, and the capital of the County Szathmar, on a small feeder of the Theiss. It has several important annual fairs, and a trade in corn and cattle. Population, 12,536.

NAHANT, a summer resort on a small rocky peninsula of Massachusetts Bay, 12 miles N. E. of Boston, separated by a narrow neck of land from the township of Lynn. Population, 880.

NAIHATI, a town of Bengal, India, 23 miles N. W. of Calcutta. Population, 29,700.

NAKOO OR **GAVIAL**. See **CROCODILE**, Vol. VI, p. 593.

NAMAQUAS, an aboriginal tribe. See **HOTENTOTS**, Vol. XII, p. 309.

NAMAYCUSH, a large trout of the family *Salmonidæ*, known to naturalists as *Salvelinus*

namaycush. It is also known as the Mackinaw trout. Specimens weighing from 15 to 50 pounds are common, and sometimes a weight of 100 pounds is reached. It is an excellent food-fish, and is found in almost all the large lakes of British America.

NAMDINH, a fortified town of Tonquin, Indo-China, 50 miles S. E. of Hunoi and 20 miles from the coast; it is the center of one of the most fertile regions of the delta; a French political agent resides here. The citadel was taken by the French by assault, Feb. 27, 1883. Population, 50,000.

NANAIMO, a town. See **VANCOUVER ISLAND**, Vol. XXIV, pp. 57, 58.

NANAK, a founder of Sikh sect. See **PUNJAB**, Vol. XX, p. 110.

NANDU OR **AMERICAN OSTRICH**. See **RHEA**, Vol. XX, p. 505.

NANSEN, **FRITHJOF**, a Norwegian Arctic explorer; born in Christiania, Norway, Oct. 10, 1861. He became curator of the zoölogical department of the Bergen Museum in 1882, and made a number of collecting expeditions for the museum. Dr. Nansen is best known by his explorations in the polar regions. His first voyage was made in 1882, when he explored the seas adjacent to Greenland and Iceland. In 1888-89 he made an unprecedented journey across Greenland's ice-cap from the east to the west coast. This exploit he described in *Across Greenland* (1890). In his explorations in the northern seas he became convinced that a constant current of water exists flowing northward from Bering Sea across the polar basin and along the east coast of Greenland, and that if a vessel could be placed in the path of this current it would be carried with the drift-ice near if not across the north pole. The one point upon which the failure of former explorers rested was the destruction of their vessels by the ice-pack. Nansen designed a vessel with rounded sides, which he thought would be lifted upon the ice and not crushed by it. In this vessel, the *Fram*, he started from Vardoe, Norway, July 21, 1893, intending to pass to the ice-drift by way of the New Siberian Islands and the Kara sea. Nothing was heard from him until Aug. 13, 1896, when his safe return to Vardoe was announced. He had been met accidentally on Franz-Josef Land by Jackson, an explorer, and



FRITHJOF NANSEN.

brought home by him. His vessel, the *Fram*, arrived at Norway a week later. The vessel had drifted with the ice-pack, but not across the pole. Dr. Nansen had left his vessel in March, 1895, when he took sledges to go directly to the pole, if possible. Lack of a sufficient number of dogs prevented his carrying out his plans. The farthest point north reached was in lat. $86^{\circ} 14'$, which is close upon three degrees farther than the farthest northern point hitherto attained by the *Alert* in 1876.

NANTICOKE, a borough of Luzerne County, eastern Pennsylvania, 20 miles S.W. of Scranton, on the Delaware, Lackawanna and Western and the Pennsylvania railroads, and on a branch of the Susquehanna River; productive anthracite coal-mines are in the vicinity. Population 1890, 10,644.

NANTUCKET, a town and the capital of Nantucket County, eastern Massachusetts, on Nantucket Island and the Nantucket railroad, 28 miles S. of Cape Cod peninsula. It is a summer resort, and has steamboat connections with New Bedford and other places along the coast; has two libraries, containing over ten thousand volumes, and a national bank with a capital of \$100,000; principal industry is cod-fishing. Population 1895, 3,017.

NAPA, a city and the capital of Napa County, in central western California, 36 miles N.N.E. of San Francisco, and 23 miles S.W. of Sacramento, on the San Francisco and Northern Pacific and the Southern Pacific railroads. It contains four public and two private schools: Oak Mound School (non-sectarian), opened in 1872, the Napa College (Methodist Episcopal), opened in 1886; also two public libraries. The state asylum for the insane has recently been completed here at a cost of more than one million dollars. Probably the best claret wine in California is made in this vicinity. Population 1890, 4,395.

NAPANEE, a town and the capital of Lennox County, eastern Ontario, on the Grand Trunk railway and on the Napanee River, 26 miles W. of Kingston. It has a paper-mill and several smaller factories. Population 1890, 2,967; 1895, 3,434.

NAPERVILLE, a city of Du Page county, northeastern Illinois, on the Chicago, Burlington and Quincy railroad, and on Du Page River. It is the seat of the Northwestern College, founded in 1861 by the Evangelical Association. Population 1890, 2,216.

NAPHTHALENE. See **TAR**, Vol. XXIII, p. 59.

NAPIER, **MACVEY**, a British encyclopædist; born in Glasgow, Scotland, April 11, 1776. His first literary work published in separate form was a treatise on the *Philosophical Works of Lord Bacon* (1817). He is known principally, however, for his work as editor of the *Supplement to the Encyclopædia Britannica*, published by Constable in 1815-24. He died in Edinburgh, Feb. 11, 1847. See **ENCYCLOPÆDIA**, Vol. VIII, pp. 201, 202.

NAPIER, **ROBERT CORNELIS**, Lord Napier of Magdala, a British general; born in Ceylon, Dec. 6, 1810. He was educated at the military college at Addiscombe, entered the Bengal engineers in 1826, served in the Sutlej campaign, and was wounded while acting as chief-engineer at the siege of Multan. He had a prominent share in the battle of Gujrat. As chief-engineer of the Punjab, with the rank of colonel, he greatly developed the resources of the country. During the



LORD NAPIER.

Indian mutiny he was chief-engineer in Sir Colin Campbell's army, and especially distinguished himself at the siege of Lucknow, and was knighted. He received the thanks of Parliament for his services in the Chinese War of 1858. As commander of the expedition in Abyssinia in 1868 he achieved a brilliant success, both by his management of the short campaign and in the storming of Magdala, which ended it. On his return he received the thanks of Parliament, an annuity of \$10,000, and was created Baron Napier of Magdala. In 1870 he was appointed commander-in-chief of the forces in India, and nominated a member of the Indian Council. In 1876-82 he was governor of Gibraltar, and on resigning was made field-marshal, and in 1886 constable of the tower. He died in London, Jan. 14, 1890.

NAPLES, a village of Ontario County, west central New York, 38 miles S.S.E. of Rochester, at the head of Canandaigua Lake, on the Middlesex Valley railroad. It has grape-box factories, a knife factory, flour, planing and saw mills. Population 1890, 1,266.

NAPO, a river of Ecuador. See Vol. VII, p. 645.

NAPOLEON, a village and the capital of Henry County, northwest Ohio, 15 miles N.E. of Defiance and 30 miles S.W. of Toledo, on the Maumee River and the Wabash railroad. It is situated in a grain-growing section, and has woolen-mills. Population 1890, 2,764.

NAPOLEON, **VICTOR JEROME FREDERICK**, a French pretender, head of the Bonaparte family of France, and claimant to the French throne; born July 18, 1862; son of Prince Napoleon and Princess Clotilde, daughter of Victor Emmanuel, King of Italy. As a royal pretender he was put forward by a party known as the Victoriens, led by Paul de Cassagnac, in opposition to his father, Prince Napoleon. The will of the Prince Imperial made Victor his successor, and the Victoriens acted upon the strength of that document. Victor did not oppose his father until 1884, when he became financially independent. Both father and son were obliged to leave France by the operation of the Expulsion Act of 1886. His father died in 1891, after which time Prince Victor was

the recognized head of the Bonapartist party in France.

NAPOLEONA, a tropical African genus of *Myrtaceae* or myrtles, with showy crimson and orange flowers, and prized in cultivation.

NAQUET, ALFRED JOSEPH, a French chemist and socialistic reformer; born in Carpentras, France, Oct. 6, 1834. From his graduation, in 1859, until 1867 he devoted himself to the study of chemistry, and in 1863, while professor of chemistry at Palermo, wrote *Modern Theories of the Principles of Chemistry*. For his part in a socialist congress at Geneva, in 1867, he was sentenced to 15 months' imprisonment, a fine of 500 francs and forfeiture for five years of all civil rights. For the publication in 1869 of a book called *Religion, Property, Family*, attacking religious marriage, he was condemned to pay a second fine of 500 francs, coupled with the loss of civil rights *in perpetuum*. He was prominent in the events of 1870, and was nominated secretary of the Defense Committee by Gambetta. He was elected to the Chamber of Deputies in 1879, and by his radical ideas soon antagonized Gambetta. He secured the passage of a bill, in 1886, legalizing divorce. He was a supporter of Boulanger, and the author of *Divorce* (1877); and *Communist and Liberal Socialism* (1890); and, in a scientific line, *Application of Analytical Chemistry to Toxicology* (1859).

NARCISSUS, in Greek mythology. See ECHO, Vol. VII, pp. 640, 641.

NARES, SIR GEORGE STRONG, a British admiral; born in Danestown, Scotland, 1831, and educated at the Royal Naval College, New Cross, England. He was on the *Resolute* in the Arctic expedition of 1852-54, and from 1872 down to the end of 1874 was in command of the *Challenger*, employed in making extensive soundings on the coast of China, in the eastern and South Pacific oceans and in other parts of the world. He was then ordered home, and appointed to the command of the Arctic expedition of the *Alert*. This expedition is described under POLAR REGIONS, (q.v., Vol. XIX, p. 324). In reward for these services Captain Nares was created a knight. He was afterward again placed in command of the *Alert*, which sailed from Portsmouth, Sept. 24, 1878, for a two-years' survey of the South Pacific. He has written interesting accounts of his voyages in the polar seas. He published *The Naval Cadet's Guide, or Seaman's Companion, Containing Complete Illustrations of All the Standing Riggings, the Knots in Use, etc.* (1860), afterward published under the title of *Seamanship*, and reports on his Arctic voyages and on the marine investigations of the *Challenger* expedition.

NARES, ROBERT, a British clergyman and writer; born in York, England, June 9, 1753. He entered the ministry of the Church of England in 1778, and was successively assistant librarian in the British Museum, canon of Lichfield, archdeacon of Stafford and rector of All Hallows Church, London. He published, in addition to sermons and theological discussions, *Elements of*

Orthoëpy (1784) and *Glossary of Phrases, Names and Allusions* (1822). He was also editor of the *British Critic* from 1793 to 1797. He died in London, March 23, 1829.

NAREW, a river of Russia. It rises in the government of Grodno and flows W.S.W. to the main stream of the Bug, which it joins at Sierock, its waters being about as great in volume as those of the Bug. It is navigable to Tykoczin, 150 miles from its mouth.

NARRAGANSETT BAY, a bay of the Atlantic Ocean which forms the principal feature of the state of Rhode Island; 28 miles in length, being known in its upper portion as Providence Bay; the Taunton, Providence, Pawtuxet and Pawtucket rivers empty into it. The bay is full of many beautiful islands, the principal ones being Canonicut, Prudence, and Rhode Island. Its waters are well guarded by lighthouses and are the pathway of a large commerce, including the Fall River line of steamers.

NARRAGANSETTS, a tribe of North American Indians of the great Algonquin family, formerly inhabiting Rhode Island, and commemorated by the bay which bears their name. During the early colonial settlement of New England, their attitude toward the whites was friendly, insomuch that Roger Williams was welcomed among them, and they were induced to waive all aboriginal rights to their territory in favor of the British crown. About the middle of the seventeenth century an expedition was sent against them, and in a series of severe encounters, they were well-nigh exterminated. The remnants of this tribe, numbering about 150, still dwell upon a reservation at Charlestown, Washington County, Rhode Island, their tribal relations having been abolished in 1880. With few exceptions they are half-breeds.

NASBY, PETROLEUM V., the pseudonym of LOCKE, DAVID ROSS; q.v., in these Supplements.

NASCENT STATE, a term applied to the condition of elements at the moment of liberation from combination. Many are then more active than later, as they are probably still in the atomic state and have not yet combined to form molecules. Nascent hydrogen, formed from a metal and an acid (iron and acetic acid or zinc and hydrochloric acid), is often used as a reducing agent, as in the manufacture of aniline from nitrobenzene.

NASEBY, BATTLE OF. See FAIRFAX, Vol. VIII, p. 852.

NASH, JOHN, an English architect; born in London in 1752. He is chiefly celebrated in connection with the great street-improvements in London, but the architecture of mansion-houses and the designing of interiors were his forte. He also possessed great skill in effective architectural grouping. He claimed the credit of the invention of the use of metal girders in the construction of bridges. Regent Street, Haymarket Theater, and the terraces in Regent's Park are specimens of his designs. The pavilion at Brighton, about which he published a book, was another of his

works. He died in East Cowes Castle, May 13, 1835.

NASHUA, a village of Chickasaw County, northeastern Iowa, 36 miles N.W. of Independence, on the Illinois Central railroad. It has an academy, a high-school, a foundry and two flour-mills. Population 1890, 1,290; 1895, 1,302.

NASHUA, a city of New Hampshire. Its public library contains to-day over 10,000 volumes, and it has three national banks, two savings banks and a large private bank. Population 1890, 19,311. See NASHUA, Vol. XVII, p. 236.

NASHVILLE, a city and the capital of Washington County, south central Illinois, 48 miles S.E. of St. Louis, Missouri, and 100 miles S. of Springfield, on the Louisville and Nashville railroad. It has a court-house, a foundry, a flour-mill and a plow factory. Population 1890, 2,084.

NASHVILLE, a city and the capital of Tennessee. It has extensive lumber industries; the number of establishments reporting in 1890 was 11, representing an investment of \$1,666,000; total wages paid, \$466,210 to 1,206 people; value of products, \$1,595,000. At the centennial celebration of the admission of Tennessee to the Union, held June 1, 1896, it was decided to hold a Centennial Exposition in Nashville, and May 1, 1897, was the date fixed upon for the opening. Immediate steps toward securing the necessary funds were taken, legislative action made certain, congressional legislation secured providing for free admission of foreign articles for exhibition, and announcements sent to the various state and foreign governments. Nashville had, in 1895, libraries which aggregated 75,000 volumes. Population 1890, 76,168. See NASHVILLE, Vol. XVII, pp. 236, 237.

NASHVILLE, UNIVERSITY OF, a co-educational institution located at Nashville, Tennessee. It was organized in 1785 as Davidson Academy, on a charter from North Carolina. The academy was changed in 1806 to Cumberland College, which in turn, in 1826, became the University of Nashville. Military training has since 1855 been a part of the collegiate curriculum. In addition to the collegiate department, there is a medical school, organized in 1850. In 1895 there were 1,108 students in attendance, with 52 instructors. The university possesses a library of about 12,000 volumes. Including 1895, 4,000 students had graduated since the organization of the university. By an arrangement with the Peabody board, 184 scholarships, with a valuation of \$100 per annum each, are maintained. The institution has an income of about seventy-five thousand dollars a year.

NASMYTH, JAMES, a British engineer, born in Edinburgh, Scotland, Aug. 19, 1808. Having studied for a few years in the public schools of his native city, he entered the High School of Arts, and finally the University. In 1828 he went to London; in 1829 found employment at Maudsley, and in 1832 opened a small engineering establishment in Manchester. Two years later he established at Patricroft, four miles from Manchester,

what came to be known as the Bridgewater foundry, by which he amassed a considerable fortune, retiring from business in 1856. In 1839 he conceived the invention of the steam-hammer, patented in 1842, and in the interim employed in France. A steam pile-driver was also included among his important inventions. After his withdrawal from commercial life he devoted himself to the study of astronomy, adopted from his own devices various improvements in the telescope, and published various treatises, among them *The Moon* (1874), conjointly with Dr. Carpenter of Greenwich, and *Remarks on Tools and Machinery*, contributed to T. Baker's *Elements of Mechanism*. His autobiography was edited by Rev. Samuel Smiler. He died May 7, 1890.

NASR-ED-DËN, Shah of Persia; born April 4, 1829; was called to the throne Sept. 10, 1848. At the beginning of the war between Russia and Turkey, in 1853, he declared his neutrality, but shortly before its close entered into a treaty with Russia. He occupied Herat in 1853, but was compelled to withdraw by the British troops. In 1866 a treaty for establishing telegraphic communication between Europe and India through Persia was signed at Teheran. He traveled in Europe in 1873, visiting every nation of that continent.

This visit was a strong argument in favor of the moderation and popularity of his rule, for although he was absent from his kingdom from May 12th till September 6th, not one breath of sedition disturbed the political calm that reigned there. He paid a second visit to Europe in 1889, and made a special journey to Russia in 1878. The diary kept by him during his first European trip was published in English in 1879. He was assassinated May 1, 1896. See also PERSIA, Vol. XVIII, pp. 651, 652.

NAST, THOMAS, an American caricaturist; born in Landau, Bavaria, Sept. 27, 1840, and brought to the United States by his father in 1846. When 14 years old he had about six months' instruction in drawing, and was then employed on *Frank Leslie's Illustrated Newspaper* as a draughtsman. In 1860 he went to England as a special artist of the *New York Illustrated News*. Thence he went to Italy, where he followed Garibaldi, making sketches for *New York, London and Paris Illustrated papers*. Returning to New York in 1861, he



NASR-ED-DËN.



THOMAS NAST.

began to draw war-sketches and political caricatures for *Harper's Weekly*, which made him very popular. His work for that periodical during the "Tammany Ring" exposures in New York City classed him as the first pictorial satirist of the country. The Republican Elephant and Tammany Tiger were his inventive allegories. He illustrated, among other books, Dickens's *Pickwick Papers* and *Pictures from Italy*, Nasby's *Swinging Round the Circle*, etc. He also indulged some in oil-painting, and after 1885 lectured on crayon-drawing.

NATAL. See **AFRICA**, in these Supplements.

NATALIE, a queen of Serbia; born May 2, 1859; married to Milan I, ex-King of Serbia, in 1875, and was divorced from him in 1888. The validity of her divorce was disputed by her Majesty, and she was sustained by the Metropolitan Michael and two other members of the Synod. It was contrary to the ecclesiastical law of the land, which alone has jurisdiction in Serbia over divorce cases, and was declared invalid by the Holy Synod. In January, 1893, a reconciliation was effected.

NATCHEZ, a city and the capital of Adams County, southwestern Mississippi, 86 miles S.W. of Jackson and 280 miles N.W. of New Orleans, on the Mississippi River and on the Illinois Central railroad. It has an extensive shipping-trade in cotton. The manufactures include cotton-mills, foundries and ice factories; is an important center of river navigation. Population 1890, 10,101.

NATCHITOCHES, a city and the capital of Natchitoches Parish, northwestern Louisiana, on Lake Cane River, and on the Natchitoches and Red River railroad, 65 miles S.S.E. of Shreveport. It is in the Red River valley, whose fertility is such as to yield large crops of sugar-cane, cotton, corn and nearly every kind of vegetable. It is the see of a Roman Catholic bishop. Steam-packets ply between this place and New Orleans. Population 1890, 1,820.

NATICIDÆ, a family of gasteropod mollusks, represented by all species in all parts of the world. They are popularly known as sea-snails. They drill holes with their lingual ribbon in the shells of other mollusks in order to devour the soft parts.

NATIONAL ASSEMBLY. See **FRANCE**, Vol. IX, p. 598.

NATIONAL DEBT. See **DEBT**, **UNITED STATES**, in these Supplements.

NATIONAL LEAGUE. See **HOME RULE**, in these Supplements.

NATIONAL LIBRARY, otherwise known as the Congressional Library; was established in 1800, but during the war of 1812 was destroyed, together with the capitol, in 1814. Many documents destroyed then it has been impossible to replace. Part of them, however, were duplicated in the library of Thomas Jefferson, which was purchased by Congress, and consisted of 7,000 volumes. The library had grown to 55,000 volumes in 1851, when by an accidental fire it was

reduced to 20,000 volumes. The next year Congress appropriated \$75,000 to replenish it. Since that time it has grown steadily, until, in 1895, it consisted of 725,000 volumes, and 220,000 pamphlets. This included the law library, which is kept in a room near the Supreme Court. The library proper occupies the entire western pro-



LIBRARY OF CONGRESS, WASHINGTON, D. C.

jection of the capitol building. A new and separate structure, which will afford room for the natural expansion and give more opportunity for classification and arrangement, has been erected. This large growth has been due in part to the liberal Congressional appropriations, averaging in the last ten years \$11,000 per annum, but more to the results of the Copyright Act and the consolidation with the library of the Smithsonian Institution. The largest private donation to the National Library has been that of Dr. Joseph M. Toner, of Washington, who in 1882 presented his private library of over 27,000 volumes. According to the regulations of the copyright laws a copy of each work copyrighted in the United States must be deposited in the National Library. This part of the law went into effect in 1870, when the Patent Office library was deposited in the National Library. The National Library is open to the public, who are privileged to use the books in the library, but not to take them away. Members of Congress alone are privileged to take the books away. The National Library is distinct from and should not be confused with the libraries of the Senate and House of Representatives. See also **ARCHITECTURE**, in these Supplements.

NATIONAL MUSEUM, UNITED STATES, at Washington, District of Columbia, incorporated by Congress in 1842; was made a part of the Smithsonian Institution in 1858. During the 16 years of its separate existence the work of collecting was done in a dilatory way, and the *Proceedings* and *Bulletins* issued irregularly. The National Museum is controlled by the officers of the Smithsonian Institution, but is maintained by a special appropriation of Congress. The collections of all expeditions connected with the various government surveys and commissions are required by law to be deposited in the National Museum. The exhibits of the United States and many foreign exhibits at various expositions have been presented to the Museum. The collections of the Fish Commission, and of the Ethnological and other national bureaus have greatly enriched the institution. The collections soon grew too large for the original building, the Smithsonian, and a

new and separate structure, at a cost of \$325,000, was erected and first occupied in 1881. Three reports are issued, known as the *Reports*, the *Proceedings* and the *Bulletins of the United States National Museum*. For methods of government, officers, etc., see SMITHSONIAN INSTITUTION, in these Supplements.

NATIONAL PARTY. See LABOR and PROHIBITION PARTIES, in these Supplements.

NATIONAL REPUBLICAN PARTY. See WHIG PARTY, in these Supplements.

NATIONAL UNION. See BENEFIT SOCIETIES, in these Supplements.

NATIONAL UNION PARTY. See REPUBLICAN PARTY, in these Supplements.

NATROLITE. See MINERALOGY, Vol. XVI, p. 423.

NATRON. See MINERALOGY, Vol. XVI, p. 399.

NATRON LAKES, eight lakes in a depression to the W. of the Damietta branch of the Nile, about sixty miles W. N. W. of Cairo. These lakes consist of eight pools below the sea-level, and are rich in natron, the collection of which gives employment to about 300 people. The locality is renowned for the four monasteries, from whose libraries of Arabic, Coptic and Syriac manuscripts, various European collections have been enriched. In the time of St. Pachomius, 5,000 anchorites dwelt here.

NATUNA ISLANDS, densely wooded and mountainous islands, N. W. of Borneo, Ranay, on Great Natuna, rising to a height of 3,500 feet. The largest of the islands has an area of 600 square miles. Population of the whole about 1,300, who grow rice, maize, sago and cocoanuts, and exchange the produce of their fisheries, their sago and cocoanut oil for iron and cottons at the European settlements on the Strait of Malacca.

NATURAL GAS, generally supposed to be the product of decomposition of vegetable and animal remains, marsh-gas being its principal element. It also contains carbonic acid, carbonic oxide, hydrogen, nitrogen, oxygen and ethylene. It is lacking, generally, in the necessary hydrocarbons which form the illuminating element of gas. Natural gas varies in its composition in different regions. In exceptional instances flows of natural gas have been found which possessed good illuminating powers, yet as a rule it is safe to state that as an illuminant natural gas is inefficient. From earliest historical times there have been recorded accounts of burning wells and springs. These springs existed in Asia and in some parts of Europe. In the settlement of America, wells and fissures from which gas escaped were discovered from time to time. The gas was first utilized in 1821 at Fredonia, New York, when its escape from a spring was conducted into the village and used for illuminating private houses. The first extensive discoveries of gas were in connection with drillings for petroleum in the Ohio valley in 1866. Previous to that time the salt-refiners of New York and Pennsylvania had encountered the gas while drilling to the salt-beds. Natural gas free from petroleum was found in the

Ohio valley, especially in the region adjacent to Pittsburg. In 1884 the commercial value of natural gas began to be appreciated and wells were drilled in large numbers, the work being carried on in almost every state in the Union, although gas has been found principally in the central section of the Mississippi valley. Owing to the great pressure of the gas when issuing from the well, it has been found practicable to conduct it to manufacturing and commercial centers sometimes several hundred miles distant. Natural gas has great heating-power, and is used in Pittsburg in the blast furnaces and glass factories, and in Chicago and other cities for heating private dwellings. It has been found that the pressure from a well gradually lessens, until in some cases the flow ceases altogether. From this fact it is supposed that the supply will become exhausted within a comparatively short time. See UNITED STATES, Vol. XXIII, p. 812; and for a description of the gas-furnace, see FURNACES, in these Supplements.

NATURALIZATION, the process by which an alien transfers his allegiance from his native country to the country of his adoption. The laws of naturalization in Great Britain are dealt with exhaustively under the title ALIEN, q. v., Vol. I, pp. 575, 576. See also ALIEN, in these Supplements.

Naturalization is regulated by each individual nation in accordance with rules and regulations stipulated by treaty with those countries from which the aliens may come. The United States long since maintained the right of an individual, of whatsoever nationality, to renounce allegiance to his native country and assume the duties of citizenship in another state. This privilege, ardently defended by the United States and denied by Great Britain, brought about the War of 1812. Acting upon this theory, the United States have further maintained the right of a naturalized citizen to claim protection, in accordance with which treaties have been made with all the European powers.

The conditions under and the manner in which an alien resident may become a citizen of the United States are prescribed by sections 2165-74 of the Revised Statutes of the United States. The alien must declare upon oath before a circuit or district court of the United States, or a district or supreme court of the territories, or a court of record of any of the states having common-law jurisdiction, and a seal and clerk, two years at least prior to his admission, that it is, *bona fide*, his intention to become a citizen of the United States and to renounce forever all allegiance and fidelity to any foreign prince or state, and particularly to the one of which he may be at the time a citizen or subject. He must at the time of his application to be admitted declare on oath, before some one of the courts above specified, "That he will support the Constitution of the United States, and that he absolutely and entirely renounces and abjures all allegiance and fidelity to every foreign prince, potentate, state or sovereignty, and particularly, by name, to the prince, potentate, state or sovereignty of which he was before a citizen or subject"; which proceedings must be recorded by the clerk of the court. If it shall appear to the satisfaction of the court to which the alien has applied that he has resided continuously within the United States for at least five years, and within the state or territory

where such court is at the time held, one year at least; and that during that time "he has behaved as a man of good moral character, attached to the principles of the Constitution of the United States, and well disposed to the good order and happiness of the same," he will be admitted to citizenship. If the applicant has borne any hereditary title or order of nobility, he must make an express renunciation of the same at the time of his application. Any alien of the age of twenty-one years and upward who has been in the armies of the United States, and has been honorably discharged therefrom, may become a citizen on his petition, without any previous declaration of intention, provided that he has resided in the United States at least one year previous to his application, and is of good moral character. (It is judicially decided that residence of one year in a particular state is not requisite.) Any alien under the age of twenty-one years who has resided in the United States three years next preceding his arriving at that age, and who has continued to reside therein to the time he may make application to be admitted a citizen thereof, may, after he arrives at the age of twenty-one years, and after he has resided five years within the United States, including the three years of his minority, be admitted a citizen; but he must make a declaration on oath and prove to the satisfaction of the court that for two years next preceding it has been his *bona fide* intention to become a citizen. The children of persons who have been duly naturalized, being under the age of twenty-one years at the time of the naturalization of their parents, shall, if dwelling in the United States, be considered as citizens thereof. The children of persons who now are or have been citizens of the United States, are, though born out of the limits and jurisdiction of the United States, considered as citizens thereof. The naturalization of Chinamen is expressly prohibited by section 14, chapter 126, Laws of 1882. Section 2000 of the Revised Statutes of the United States declares that "all naturalized citizens of the United States while in foreign countries are entitled to and shall receive from this government the same protection of persons and property which is accorded to native-born citizens." The right to vote comes from the state, and is a state gift. Naturalization is a Federal right, and is a gift of the Union, not of any one state. In nearly one half the Union, aliens (who have declared intentions) vote and have the right to vote equally with naturalized or native-born citizens. In the other half, only actual citizens may vote. (See the tabulation under ELECTION LAWS, in these Supplements.) The Federal naturalization laws apply to the whole Union alike, and provide that no alien may be naturalized until after five years' residence. Even after five years' residence and due naturalization, he is not entitled to vote unless the laws of the state confer the privilege upon him; and he may vote in several states six months after landing, if he has declared his intention, under United States law, to become a citizen.

Naturalization, it is to be observed, has no effect on a citizen's previous disabilities or liabilities. Thus a fugitive criminal, within the terms of an extradition treaty, is liable to rendition, notwithstanding naturalization in the country to which he has fled. So, too, persons liable to compulsory military service in European countries coming to the United States and becoming naturalized, are still subject to arrest, punishment or military service in case they revisit their native country.

Naturalization may take place by special enactments which suspend for a time the action of the general laws. Such was the case when the United States purchased Louisiana and agreed to grant the rights of citizenship to all actual inhabitants of the territory. This method is technically known as "collective naturalization." The basis of the present United States naturalization law

was the act of 1802; and the provisions regarding minors were passed in 1824.

NAUCRATIS or NAUCRATES, an ancient city of Egypt founded by and flourishing under the Greeks about 550 B. C. There the Greeks were obliged to concentrate their Egyptian settlements and trade. It was situated on the present site of Sa-el-Hadjar, in the delta of the Nile, on the eastern bank of the Canopic branch. It was for a time a place of great influence and prosperity. Its ruins are very rich in antiquities, and since its discovery in 1883 much light has been thrown upon the histories of Egypt and Greece, and the relations of the two countries. The famous temple of Aphrodite was located there.

NAUGATUCK, a town of New Haven County, western Connecticut, 15 miles N.W. of New Haven, on the Naugatuck River and on the New England and the New York, New Haven and Hartford railroads. It has manufactures of india-rubber goods, knit underwear, buttons, machinery and cutlery; also has a national bank with a capital of \$100,000. Population 1890, 4,780.

NAUMANN, JOHANN FRIEDRICH, a German ornithologist; born in Ziebigk, near Köthen, in 1780. After being educated at Dessau he devoted himself to natural science. The Duke of Anhalt-Köthen made him keeper of the ornithological museum. His chief work is *Natural History of German Birds* (1822-44), which is a standard work on the ornithology of Germany. He died in Köthen, in 1857.

NAUPLIUS. See ARTHROPODA, Vol. II, pp. 648, 649; and CRUSTACEA, Vol. VI, pp. 645-654.

NAUTCH GIRLS or BAYADERE, the girls of India trained in the nautch, a combination of song and dance, much in vogue at all Hindu festive and other public occasions. The dance, made up of body and muscle movements in connection with the song, is supposed to portray some event or emotion. In some portions of India, bands of these girls are kept in the temples to aid in the rites.

NAUTICAL ALMANAC. See ALMANAC, Vol. I, p. 592; and NAVIGATION, Vol. XVII, pp. 260-262.

NAUTILIDÆ. See MOLLUSCA, Vol. XVI, pp. 669-683; and CUTTLE-FISH, Vol. VI, pp. 735-740.

NAUVOO, a village of Hancock County, northwestern Illinois, 32 miles S. of Burlington, Iowa. The Mormons, who founded the place in 1840, erected here a large and costly limestone temple, which now, however, is but a ruin. It has a Catholic academy, two wagon-shops and two cigar factories. Population 1890, 1,578.

NAVAJOS INDIANS, a tribe of North American Indians, members of the Athabascan family. They were first known as a distinct tribe in 1630, when they were visited by the Spanish. At that time, and until the beginning of the nineteenth century, they occupied a large part of Arizona and New Mexico and the southern portion of Utah and Colorado. They were held in comparative check by the Utes on the north

and the Apaches on the south. Their present reservation embraces the adjoining corners of Arizona, New Mexico, Utah and Colorado. They numbered in 1895 about 20,500.

NAVAL ACADEMY OF THE UNITED STATES, THE, a government training-school for cadets of the American navy, in relation to which it occupies the same position as WEST POINT (q.v., in these Supplements) does to the army. The Naval Academy is located at Annapolis, Maryland, and occupies the site of old Fort Severn and some adjoining ground. As will be noticed by a reference to the accompanying ground-plan of the Naval Academy, no more suitable location for naval cadets could have been selected. The Severn River affords excellent facilities for practical instruction in boat-drill, as well as providing anchorage for the vessels in which the cadets are exercised and taken for sea-cruises. The academy was opened for the reception of cadets on Oct. 10, 1845, though the movement for its establishment dates back to a meeting of officers on the United States ship *Constitution*,

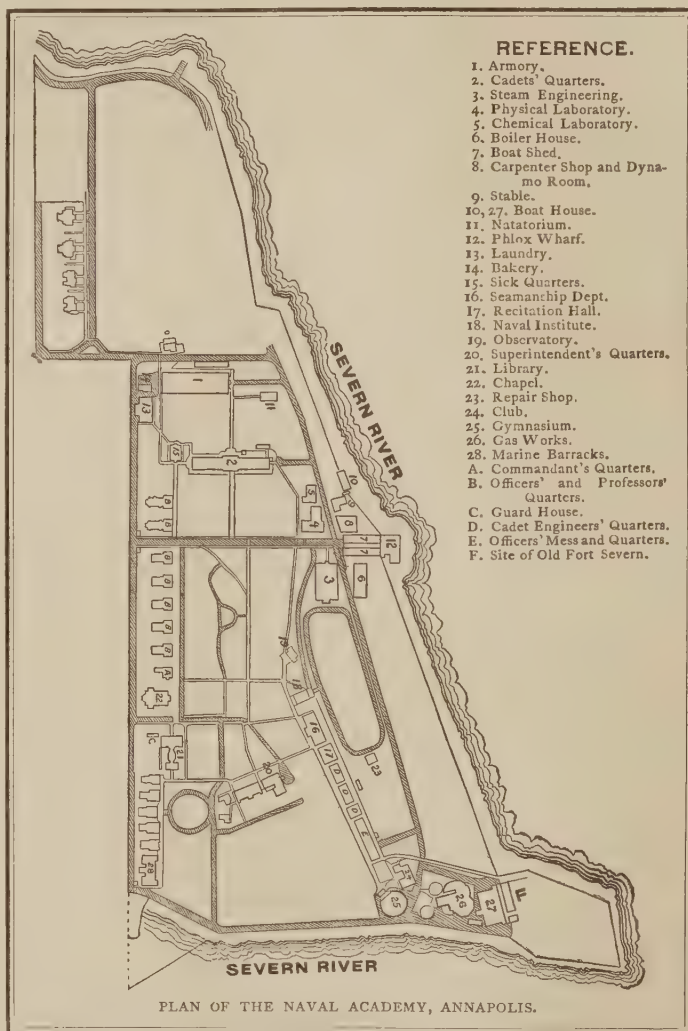
when certain resolutions were adopted and transmitted to the Senate April 23, 1836. The site of the academy was selected at Annapolis, upon the land known as Windmill Point, the easternmost extremity of the town. Fort Severn played a prominent part in the second war with Great Britain, when the little town was blockaded by the English fleet, and nothing but the guns of Fort Severn, manned by resolute citizens, drove the enemy down the bay. Prior to the founding of the academy a partial and unsat-

isfactory system of instruction had been pursued by means of 25 teachers or schoolmasters, of whom 14 were afloat and the remainder distributed between Boston, Norfolk and Philadelphia. Later, these constituted a board of examiners of midshipmen, but the method of theoretical instruction was far below the proper standard. With the commencement of the academy the system was entirely changed. Commander Franklin

Buchanan (q.v., in these Supplements) was the choice of Secretary Bancroft for the onerous duties of organizing America's naval college. This officer had already given much thought to the subject, and speedily formulated a comprehensive plan of the naval school. As such and under that title it was carried on until July, 1850, graduating many excellent officers. Commander Buchanan left the school for active service afloat in the Mexican War, and was succeeded by Commander G. P. Upshur. On July 1, 1850, Commander C. K. Stribling succeeded Commander Upshur as superintendent. A period of transition ensued from July, 1850, to November, 1851, where-in the institution, thenceforth

style the United States Naval Academy, was placed under the chief of the Bureau of Ordnance and Hydrography. The final organization of the academy took place in 1851, when many important changes were introduced. Commander L. M. Goldsborough relieved Captain Stribling as superintendent on Nov. 1, 1853, being in September, 1857, relieved in his turn by Captain George S. Blake.

The full list of superintendents, with the dates of their assumption of command, is as follows:



SUPERINTENDENTS.	ASSUMED COMMAND.
Commander Franklin Buchanan-----	Sept. 3, 1845.
Commander George P. Upshur-----	March, 15, 1847.
Commander Cornelius K. Stribling-----	July 1, 1850.
Commander Louis M. Goldsborough-----	Nov. 1, 1853.
Captain George S. Blake-----	Sept. 15, 1857.
Rear-Admiral David D. Porter-----	Sept. 9, 1865.
Commodore John L. Worden-----	Dec. 1, 1869.
Rear-Admiral C. R. P. Rodgers-----	Sept. 22, 1874.
Commodore Foxhall A. Parker-----	July 1, 1878.
Rear-Admiral George B. Balch-----	Aug. 2, 1879.
Rear-Admiral C. R. P. Rodgers-----	June 13, 1881.
Captain F. M. Ramsay-----	Nov. 14, 1881.
Commander W. T. Sampson-----	Sept. 9, 1886.
Captain R. L. Pythian-----	June 30, 1890.
Captain P. H. Cooper-----	Nov. 15, 1894.

When secession commenced, the situation at the Naval Academy became serious and alarming. Some of the Southern midshipmen sent in their resignations, disloyalty to the Union was prevalent in the vicinity, and the superintendent received warnings of a threatened attack. He drew up a plan of action and proposed to embark his officers and men on the frigate *Constitution*, then moored off Fort Severn, and take the vessel to Philadelphia, so as to prevent the capture of this historic vessel by the Confederate forces, but the Confederates hesitated, and Federal troops arrived. On April 27, 1861, the removal of the academy was ordered to Newport, Rhode Island; where at Fort Adams it remained until 1865,



CADET-MIDSHIPMEN'S QUARTERS, ANNAPOLIS, MD.

when a return to Annapolis was made. In 1865 a department of steam-engineering was established; in 1868 the chapel was built and the old chapel was converted into a hall for trophies and models. In 1869 the new quarters for the cadets were finished and the use of the *Constitution* as a school-ship was discontinued. The *Santee* was fitted up as a gunnery-ship, and in 1871 the old *Constitution* was removed from the academy.

During Admiral Porter's superintendency the executive mansion of the governor of Maryland, with the surrounding grounds, was bought by the government and inclosed within the academic walls. A new row of officers' quarters and a house for the board of visitors took the place of the executive mansion's wings, while the mansion itself became the library building of the academy. In 1862 the academy was placed under the supervision of the Bureau of Navigation, and on March 1, 1867, it came under the direct care and supervision of the Navy Department.

The grounds within the academic walls comprise some fifty acres, with 109 acres additional outside the walls. Picturesquely situated on the margin of the Severn River, the grounds are well timbered and are the acme of neatness. In front of the midshipmen's quarters stands the officers' monument, dedicated to the naval heroes who laid down their lives for their country in the war with Tripoli.

Cadets are appointed by members of the House of Representatives, each member being allowed one cadet graduate every six years. There are in addition 11 who are appointed by the President of the United States. After appointment the candidates are required to pass examinations, both physical and educational. In the beginning the course of instruction extended over five years, three of which were to be spent in sea-service. This has been so modified that the course is four years of academic study, supplemented by two years' practical instruction at sea. All cadets pursue the same curriculum for three years, but during the fourth year the engineer cadets devote their time almost exclusively to the study of engineering. Upon graduation the cadets are commissioned as ensigns, second lieutenants of marines, or as assistant engineers, the nature of the appointment being dependent upon the branch of the service for which the cadet has been prepared. There were in 1896, 214 cadets in attendance, of whom 38 were in the graduating class, 12 of these being intended for the engineer and the remainder for the marine and line corps. The academic staff, or faculty, numbered 56 commissioned officers, 49 of the line, besides six of the engineer and one of the medical corps. See also NAVY, Vol. XVII, pp. 300, 301.

NAVAL OBSERVATORY, an American governmental institution, was established in 1842 under the name of the "Depot for Naval Charts and Instruments." It is under the supervision of the Bureau of Navigation, and is located at Georgetown Heights, Washington, District of Columbia, and has a superintendent and a staff of twelve naval scientific officers and assistants. Its most important function is astronomical, the *Nautical Almanac* (q.v., in these Supplements), under separate charge, being compiled at the observatory. The new buildings have been equipped at an outlay exceeding, it is believed, that of any similar establishment in the world. A review of its past and present system of appointing its chief officers and the scope of the work is well summarized in the following extract from Secretary of the Navy Tracy's report to Congress December, 1891, his recommendations being indorsed by twenty directors of astronomical observatories in the United States: "The system in existence hitherto, by which the selection of the superintendent has been confined to line officers of the navy, subject, like other officers, to changes of duty at comparatively short intervals, prevents that continuity of administration which is essential in carrying on the work of a great national observatory. No programme of scientific investigation,

especially in the department of astronomy, can be carried out successfully by any institution if liable to frequent interruptions by a change of its administrative head. I therefore recommend the adoption of legislation which shall enable the President to appoint, at a sufficient salary, without restriction, from persons either within or outside of the naval service, the ablest and most accomplished astronomer who can be found for the position of superintendent. I would also recommend, in view of the era of progress and scientific development upon which the observatory is now entering, that an advisory council be organized, composed of the superintendent of the observatory and its senior professor and of three other persons of scientific attainments, whose duty it shall be to consider and report upon new instruments and their proper installation, to draw up, with such changes as may be necessary from time to time, the programme of scientific work, including observation, reduction and publication, and to make such inspections and reports as may be desirable in regard to the character of the work done by the observatory." See also OBSERVATORY, Vol. XVII, p. 708.

NAVAL ORDER OF THE UNITED STATES. See COLONIAL SOCIETIES, in these Supplements.

NAVAL RESERVE OR NAVAL MILITIA, in the United States, is a part of the National Guard. The total strength of the Naval Reserve is 3,392, its members being distributed in such states as have a water-front, either sea or lake. The reserve is organized and regulated in a manner similar to the National Guard of each state, having regular drills and an annual rendezvous. It is meant to familiarize suitable citizens with naval affairs for the purpose of supplying the positions of officers in case naval service becomes necessary at any time for the protection of United States coasts. On March 2, 1891, at the suggestion of Secretary of the Navy Tracy, who pointed out the importance of the naval militia as a defensive arm of the service, Congress appropriated \$25,000 for the purchase of arms for the Naval Militia or Reserve, to be expended under the direction of the Secretary of the Navy. There are thirteen states that have organized naval forces, and which share in the annual appropriations of the government. The government thus fully recognizes the value of the naval reserve. Besides these annual appropriations, the Navy Department has made other donations toward the efficiency of various naval stations. To the state of New Jersey the department transferred the United States ship *Portsmouth* and the United States monitor *Ajax*, with their guns, rigging and equipment, which represent a large amount of money. At the close of the World's Columbian Exposition, Congress passed an act, giving the boats and other equipments exhibited on board the model battle-ship to the state of Illinois (Chicago battalion) for the use of its naval militia. The boats included a 33-foot steam-launch, a 33-foot sailing-launch, a 28-foot cutter, a 26-foot cutter, a gig, a whale-

boat, a dingy and a catamaran. They were all made at the Brooklyn navy-yard, and are the finest examples of boat-building in existence.

NAVARRETE, MARTINO FERNANDEZ DE, Spanish naval officer and historian; born in Availos, Logroño, Nov. 8, 1765. He fought in the Spanish navy against the Barbary pirates and against the French in the Mediterranean. Afterward he made extensive investigations of Spanish discoveries in the fifteenth century and published the results. He was recognized as a naval authority, held important positions in the hydrographic office, was instrumental in building up the Madrid Academy of History, and was a Senator later in his life. He was the author of a *Life of Cervantes* (1820), and after his death appeared his treatise on the *History of Spanish Navigation* (1846). He died in Madrid, Oct. 8, 1844.

NAVARRO, MARY ANTOINETTE ANDERSON, an American actress; born in Sacramento, California, July 28, 1859. She was educated at the Ursuline convent of that city and began to study for the stage at the age of 13. On Nov. 27, 1875, she made her first appearance in Louisville, Kentucky, as Juliet, in *Romeo and Juliet*, with much success. She began playing in New York on Nov. 16, 1876. In 1879 Miss Anderson visited Europe for study and recreation. On her return home she added to her repertory of characters Galatea, in Mr. Gilbert's adaptation of *Pygmalion and Galatea*. On Sept. 1, 1883, she made her *début* in London, at the Lyceum Theatre, as Parthenia, followed by Pauline and Galatea, and immediately became a great favorite. During a later engagement she produced the *Winter's Tale*, which ran through an entire season, and thereafter transferred the play, including scenery, property and actors, to America, with equal success. Miss Anderson married, at Hampstead, England, June 18, 1890, Antonio F. de Navarro, son of a wealthy Mexican resident of New York City, and retired from the stage. In 1896 Mrs. Navarro published her reminiscences, under the title of *A Few Memories*. The book had considerable success on account of the frank, unconscious personality of the author, which imbued the work with a quality of more value than mere literary merit.



MARY ANDERSON NAVARRO.

NAVASOTA, a village and a railroad junction of Grimes County, southwestern Texas, 95 miles E. of Austin and 95 miles S.W. of Galveston, on the Gulf, Colorado and Santa Fé, and the Myrtle Springs Short Line railroads. It is in an agricultural and cotton-growing district. It has good educational institutions, and manufactures cotton, flour, cottonseed-oil, carriages and wagons. Population 1890, 2,997.

NAVASSA, an island in the West Indian group,

in lat. $18^{\circ} 26' N.$, long. $75^{\circ} 3' W.$ This island, under the provisions of title 72 of the Revised Statutes, has been recognized as appertaining to the United States. It contains guano deposits, is owned by the Navassa Phosphate Company, and occupied solely by its employees. In September, 1889, a revolt took place among these laborers, resulting in the killing of some of the agents of the company, caused, as the laborers claimed, by cruel treatment. These men were arrested and tried in the United States court at Baltimore, under section 5576 of the statute referred to, as if the offenses had been committed on board a merchant vessel of the United States on the high seas. There appeared, on the trial, such evidence of the bad treatment of the men, that, in consideration of this, and of the fact that the men had no access to any public officer or tribunal for protection or for the redress of their wrongs, President Harrison commuted the death sentences passed by the court against three of them, and the President, in his message of December, 1891, strongly recommended such legislation by Congress as should place labor contracts upon this and other islands having a similar relation to the United States under the supervision of a United States court commissioner for protection and for the redress of wrongs.

NAVE. See ARCHITECTURE, Vol. II, p. 468.

NAVESINK OR NEVERSINK HIGHLANDS, a range of hills on the south side of Sandy Hook Bay, extending to Raritan Sound, about 20 miles S. of New York City, in Monmouth County, New Jersey. The highest point is Mount Mitchell, which is 282 feet high. On an elevation 195 feet high stand two first-class lighthouses, each 53 feet high and but 100 feet apart.

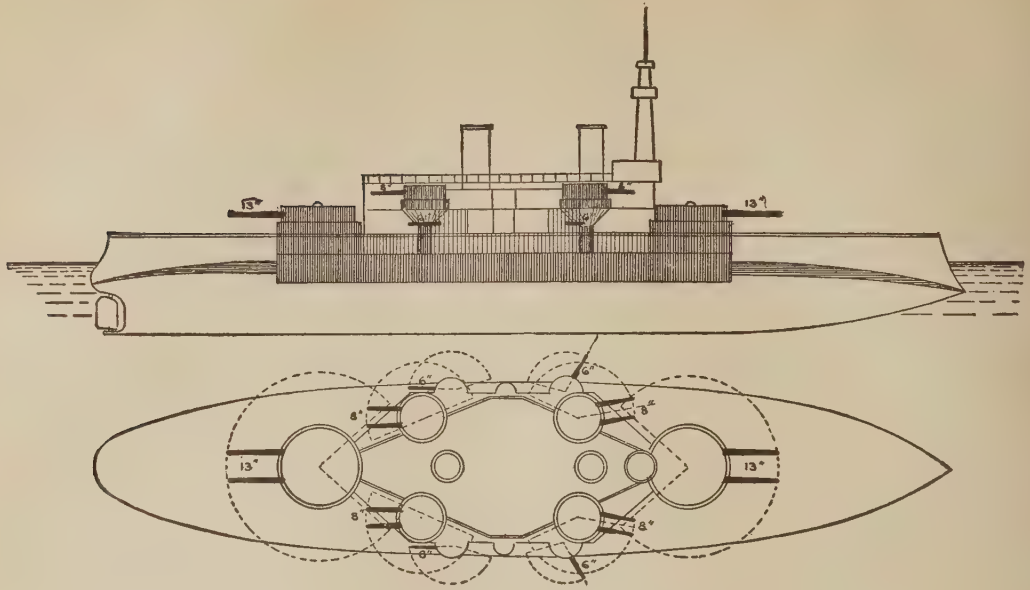
NAVEW, a garden vegetable much cultivated in France and other parts of the continent of Europe. The part used is the tapering root, which is rather like a carrot in shape. Its color is white. Its flavor is much stronger than that of the turnip.

*NAVY OF THE UNITED STATES. The past ten years have witnessed the transformation of our navy from a fleet of slow-steaming wooden vessels, with sail-power and antiquated batteries, into a fleet of sailless, rapid steel steamers, whose construction is in all respects not only equal to that of the vessels of any other nation, but is, in many cases, superior. Our first efforts were in the cruiser line, but of late we have gone into the construction of battle-ships, and the same success that attended the construction of the cruisers has followed in the new line. Our battle-ships *Indiana*, *Massachusetts* and *Oregon*, completed during the latter part of 1895 and early 1896, are model fighting-ships, while the *Kearsarge* and *Kentucky*, under construction, are believed to combine the qualities of attack and defense in a superior degree.

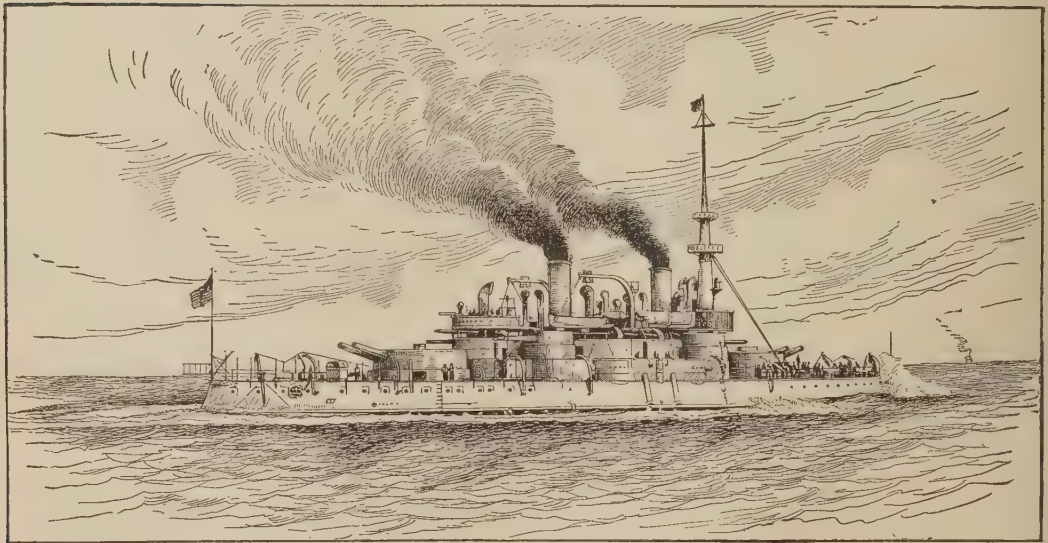
All homogeneous fleets are composed of battle-ships, armored and protected cruisers, scouts, torpedo-vessels and torpedo-boats, while monitors and rams are essential for harbor-defense, and gunboats for cruising and police duties in time of peace.

A battle-ship is practically a locomotive fort, and in its accepted form consists of a twin-screw steel hull minutely subdivided below the water-line by

transverse and longitudinal bulkheads, with heavy steel armor along the water-line for about two thirds the length of the ship, forward and aft of which there is worked a heavy curved protective deck, which terminates forward in a powerful ram bow, and aft in the stern-post or the rudder-post. Below this deck are located the magazines, the boilers and engines, the steering-gear, the machinery for working the turrets, and all parts of the operating mechanism which might be disabled if placed above the water-line, and whose disablement would impair the fighting efficiency of the ship. The machinery occupies the central portion of this space below the protective deck, the engines side by side in a separate water-tight compartment, and separated from the boilers, which are also in separate compartments, by transverse coal-bunkers. Between the engines and the side of the ship are coal-bunkers, which, also, are fitted alongside the boilers, and generally in two subdivisions, in order to afford protection and to increase the stability of the ship in case of injury. In addition to these bunkers, there are others above the protective deck, so arranged that they feed into the lower ones, the capacity of all being generally between 1,000 and 2,000 tons. Beneath the engines and boilers an inner skin is worked, generally inclosing a space from four to five feet in depth, known as the double bottom, between it and the outer skin. This space is subdivided, so that if, through grounding or other cause, the ship's bottom were punctured, the damage would be localized, and there would be no danger of the loss of the ship. Forward and aft of the machinery space are magazines, storerooms for provisions, clothing and other necessary articles, torpedo-rooms, water-tanks, chain-lockers and spare gear. Above the armored belt at the water-line there is a stretch of thin armor extending to the battery deck, where the heaviest guns are mounted, usually in pairs, at the center line of the ship, and at a point about in line with ends of the armor belt; between these heavy guns are lighter ones, in an inclosed superstructure or casemate having armor protection. Still higher, and usually on each side of the ship, are mounted armor-piercing guns intermediate in caliber between the two sizes mentioned. On the same deck, and at the ends of the casemate, are placed the conning or fighting towers, which are generally six or seven feet in diameter, and heavily armored, and from which the movements of the ship are directed in action. In these towers are placed steering-wheels, communicating by wire rope with the steering-engines below the protective deck, telegraphs to and from the engine-rooms, with reply-connections to show that the signals have been understood, other telegraphs which show the direction of revolution of the main engines and the speed at which they are running, speaking-tubes and call-bells to all important stations in the ship, telephone connections, etc. There are usually one or two military masts, without yards or sails, save light yards for signal purposes, and fitted to them are tops, in which are mounted small rapid-fire and machine guns for the purpose of raking the deck of an adversary during action. On the



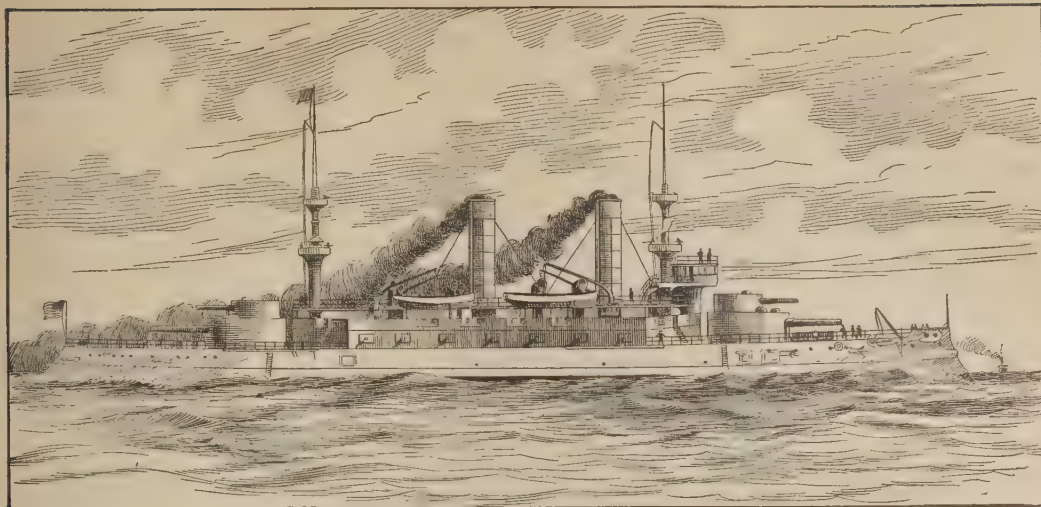
BATTLE-SHIP MASSACHUSETTS—SIDE ELEVATION AND DECK PLAN.



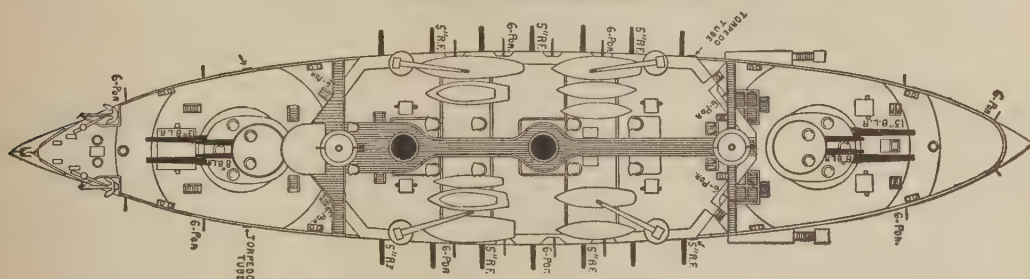
BATTLE-SHIP MASSACHUSETTS—AT FULL SPEED.

upper deck are mounted a number of small rapid-fire guns, and searchlights are disposed so as to command the approach to the ship from all directions. Besides the usual complement of small boats, a battle-ship usually carries one or two small torpedo-boats, which, in addition to the service of the ship, are utilized for firing torpedoes, though their true value in war would probably be very small, as their size is such that little could be expected of them. The ship is lighted by electricity and artificially ventilated, is heated by steam, has apparatus for distilling sea-water for drinking purposes and for making ice, has a workshop supplied with machine-

tools capable of doing almost any work that would be required, engines for hoisting boats and operating the heavy guns, and is fitted generally with mechanical appliances for doing almost anything necessary to make the ship self-sustaining. One of the important lessons learned from the Japan-China war was, that the presence of so much woodwork as formerly found a place in our ships is a source of great danger during an engagement, from the fact that it is set afire so easily, and so all recent designs provide for little or no woodwork, its place being taken by light sheet-metal, or by some kind of incombustible wood.



A BATTLE-SHIP OF THE KEARSARGE TYPE.



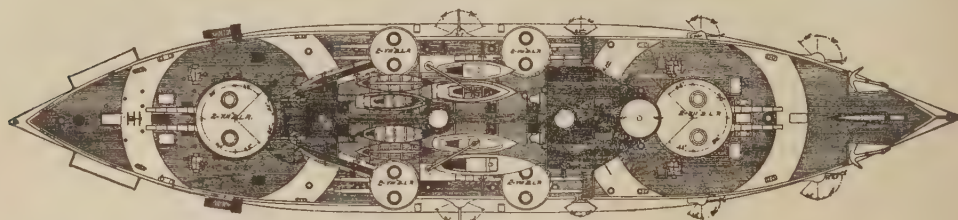
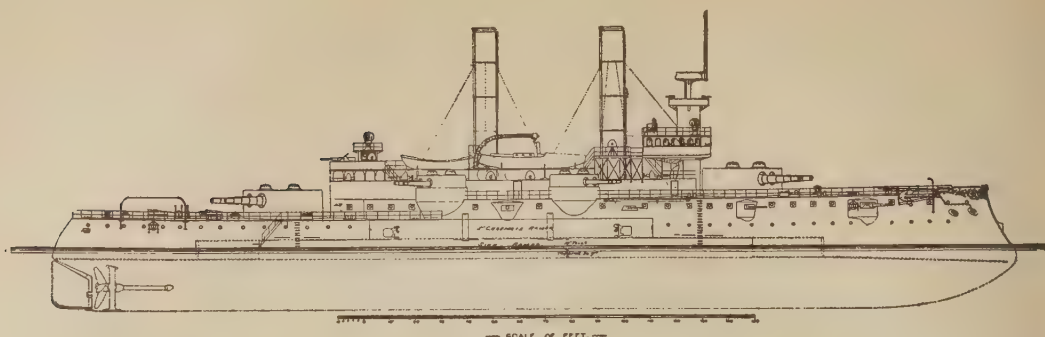
DECK PLAN OF U.S.S. KEARSARGE AND KENTUCKY.

Until 1894 the prevailing practice with most foreign countries in the construction of battle-ships was to fit a small amount of very heavy armor for a certain distance along the water-line, and leave the remainder of the side almost unprotected, save by thin armor. A change, however, has taken place, and the latest designs for British battle-ships provide for a much greater area of heavy armor, with a corresponding reduction in its thickness. The French have long insisted upon the importance of a complete water-line belt; but, as its weight entails certain sacrifices in other directions, other countries have not gone to the extent that the French have in this direction.

The *Kearsarge* may be taken as a typical battle-ship, and a description of her will serve for that of other battle-ships, and, with certain modifications, which will be stated, for that of other types of naval vessels. She is built entirely of steel, is 368 feet long on the water-line, 72.2 feet beam, 23.5 feet mean draft, and of 11,500 tons displacement. She has engines of 10,000 horse-power, and will steam at a speed of 16 knots an hour. In outward appearance she resembles the *Indiana*, except in the arrangement of the turrets for the 8-inch guns, and in that she has two military masts instead of one. In previous battle-ships the practice had been to mount the very heavy guns in turrets, a pair of each caliber in a separate turret, those of medium caliber in rear of, above and outboard of the heaviest ones;

but in the *Kearsarge* and *Kentucky* the turrets are superposed or "two-story," the 8-inch ones being on top of the 13-inch, and revolving with them. This arrangement gives the greatest concentration of fire, and it is believed that there is not a battle-ship afloat that can withstand the fire from the guns as arranged in the *Kearsarge*. The main battery consists of four 13-inch, and four 8-inch rifles, and fourteen 5-inch rapid-fire guns; and the secondary battery of twenty 6-pounder, four 1-pounder, four Gatlings and one field gun. The 5-inch guns are placed in the citadel between the turrets, and the rapid-fire and machine guns on the deck above, in the military tops, and on the deck below the main deck.

The armor belt extends along the water-line from the bow to the after barbette, and is 3.5 feet above and 4 feet below the water-line; it is 15 inches thick at the top, and tapers to 9½ at the bottom, along the machinery spaces, forward of which it tapers to 4 inches at the bow, where it meets the ram. The protective deck, which extends from the ends of the armor belt to the bow and stern respectively, varies in thickness from 2¾ to 5 inches. Above the belt, to the height of the main deck, the armor is 5 inches thick, and that of the citadel containing the 5-inch guns, 6 inches. The armor on the 13-inch turrets is 17 and 15 inches, on the 8-inch turrets 11 and 9 inches, on the barbettes 15, and on the conning-towers 10 inches. All the armor is Harvey-



SHEER AND DECK PLAN OF U. S. S. IOWA.

ized nickel steel. Each 13-inch gun throws a projectile weighing 600 pounds, and each 8-inch gun one weighing 290 pounds. There are two military masts, with fighting tops, in which will be mounted rapid-fire guns. Five torpedo-tubes, one in the stem, and the others in broadside on the lower deck, complete the armament. The supply of torpedoes, which are of the automobile type, is eight. The engines are of the triple-expansion type, and have been designed to develop 10,000 horse-power at full speed; they have three cylinders each, and are placed in separate water-tight compartments, each operating its own screw. The boilers are designed to work at a pressure of 160 pounds per square inch, and to furnish all the steam that the engines can work off at that pressure; when working at full power the draft is forced by steam-fans, delivering air under pressure into an air-tight fire-room, in which each boiler is placed. When fully equipped and ready for sea, she carries 1,210 tons of coal, and draws 25 feet of water. The contract price for her construction, exclusive of the cost of her armor and guns, is \$2,250,000, and when completed and ready for sea, she will have cost about \$3,500,000.

A good idea of the distribution of weights in a modern battle-ship will be obtained from the following table, which is for the British battle-ship *Majestic*:

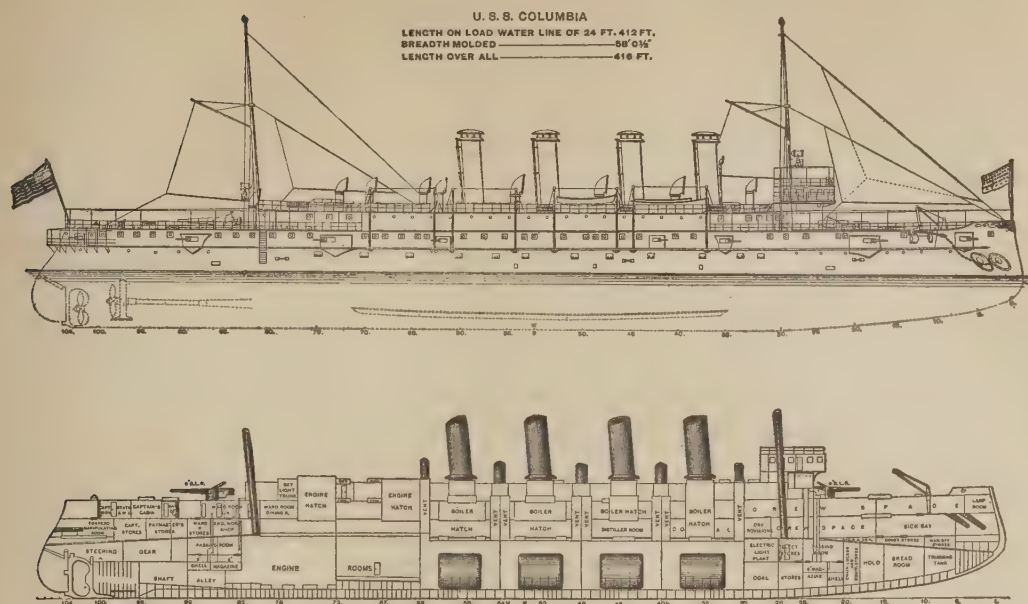
	TONS.
Steel in hull	4,340
Protective material	1,410
Armor	2,850
Backing	160
Wooden decks, etc	570
Fittings	850
Hull complete	10,180
Equipment	600
Armament	1,500
Machinery	1,300
Coal	900
Total	14,480

Besides the vessels of the *Indiana* and *Kearsarge* classes, which are, strictly speaking, the only vessels we have of the battle-ship type, we have two others, the *Maine* and the *Texas*, which are closely akin to them in general system of construction and armament, but are much smaller and not so heavily armed or protected. They are of 6,682 and 6,315 tons displacement, respectively, and 17 knots speed. The *Maine* carries four 10-inch and six 6-inch guns, and the *Texas* two 12-inch and six 6-inch guns. Each has side-armor 12 inches thick, but its extent is much less than in the battle-ships.

In addition to these, we possess six formidable vessels for harbor-defense, in the double-turret monitors *Amphitrite*, *Miantonomoh*, *Monadnock*, *Monterey*, *Puritan* and *Terror*. All except the *Puritan* are of about 4,000 tons displacement, and have a speed of from 12 to 14 knots. The *Puritan* is of 6,000 tons, and has a speed of 13 knots. All except the *Monterey* and *Puritan* carry four 10-inch guns, mounted in pairs, as in the battle-ships; the *Monterey* two 12-inch and two 10-inch, and the *Puritan* four 12-inch guns. The armor on the *Monterey* varies in thickness from 13 to 6 inches, on the *Puritan* from 14 to 6, and on the others from 9 to 7 inches; that on the turrets is from 7½ to 11½ inches thick.

These vessels, having been designed specially for harbor-defense, are not expected to do such cruising-work as is done by the other battle-ships, although they are capable of cruising in comparative comfort. On account of their low freeboard, they are intended to fight only in comparatively smooth water.

There are, besides the above, 13 other monitors, which were constructed during the Civil War, and which would be of comparatively little value in these days of high-powered guns. They are built of iron, have a speed of from 6 to 7 knots, and mount, each, two 15-inch smooth-bore, muzzle-load-



ing guns, in one turret. Their side-armor is only 5 inches thick, and that on the turret 10 to 11 inches. With modern guns, however, they might be of some service as harbor-defense vessels.

The next most important vessels in our navy are the cruisers, which are built primarily for speed, and which differ in construction from the battle-ships principally in having little or no vertical armor along the water-line, the protection to the vitals of the ship being afforded by a thick protective deck, and in having lighter protection for the guns than the battle-ships have. The vessels are smaller than the battle-ships, and also carry a lighter battery. In them, offensive and defensive qualities have been sacrificed for speed and for coal-carrying capacity, in order that they may be able to remain at sea a considerable length of time, and overtake a merchantman once he is sighted; that they may act as scouts for a fleet, and perform those duties, in peace, necessary for the protection of our commerce and the maintenance of our position amongst the great nations of the earth. Two of our cruisers, the *New York* and the *Brooklyn*, have a small amount of light side-armor, three inches thick in the former and four in the latter. The *New York* mounts six 8-inch and twelve 4-inch, and the *Brooklyn* eight 8-inch and twelve 5-inch guns. These vessels are regarded justly as the finest vessels of their class afloat, and the former, on her trial in 1892, maintained for four hours a speed of 21 knots an hour. Her engines are of 17,400 horse-power, and have been designed so that the ship may cruise economically at low speed. For this reason there are four engines of the same size in the ship, two on each shaft, and so arranged that the forward ones, which, like the after ones, are each in a separate water-tight compartment, may be disconnected when cruising at low speed. The operation of disconnecting or connecting takes only about 20 minutes, as compared with

36 hours on the English cruiser *Blake*, of similar construction. Two others of our cruisers which have been the subject of universal commendation, and of no little amazement, are the *Columbia* and the *Minneapolis*, of 7,375 tons displacement, which, on trial, made the unparalleled speed of 22.81 and 23.07 knots respectively. These vessels are intended as "commerce-destroyers," and in them much of the offensive power of previous cruisers has been sacrificed to speed and endurance, their battery comprising but one 8-inch, two 6-inch and eight 4-inch guns. To get such speed as these vessels attained, and at the same time to make them fairly economical cruisers in time of peace, the power was divided among three screws, one in the center and one on either side, as is usual in twin-screw steamers, each screw operated by an engine of equal power. While this system of propulsion had previously been tried on a few small vessels, the *Columbia* marked its first successful application to vessels of considerable power, and since her advent a number of similar designs have been projected abroad. Up to 1896 there was not a vessel of their size in any navy with a speed equal to theirs, and there was not in any navy a vessel of any size which had maintained such a speed over a measured course for so long a time as they did. In July, 1895, the *Columbia* made the run from the Needles to Sandy Hook, a distance of 3,090 miles, in 6 days, 23 hours and 49 minutes, thus maintaining an average speed of 18.41 knots for the distance,—a performance which no other man-of-war afloat, except the *Minneapolis*, could approach, and one which has never been equaled by any vessel of her size, naval or merchant. That she did not make greater speed is due entirely to the fact that she does not carry coal enough to enable her to cross the ocean at a much higher rate.

Next in importance comes the *Olympia*, a vessel.

of 5,600 tons, which made a speed of 21.69 knots on her acceptance trial. Her battery is a very formidable one for a vessel of her size, comprising four 8-inch and ten 5-inch guns, and makes her a most valuable addition to our list of fast cruisers. Following her come the vessels of the *Baltimore* class, including the *Newark*, *Philadelphia* and *San Francisco*, whose displacements range from 4,100 to 4,500 tons, and speed from 19 to 20 knots. They mount a heavy battery, are well protected, and are much more economical to maintain than large cruisers of corresponding speed. At the same time they are quite up to the standard of cruisers of similar class in foreign navies. Coming down to the other cruisers, the most important one is the *Chicago*, whose original design was completed in 1883, since which time so many improvements have been made that her machinery is to be removed and entirely new machinery of modern design substituted, which will result in increasing her speed from 15 to about 19 knots, and, with the modifications in her battery which will be made at the same time, in making her a vessel equal in all respects to the vessels of her class. The *Charleston*, *Atlanta* and *Boston* come next, the two latter having been built at the same time as the *Chicago*, and the latter from plans purchased in England, and modified by the Navy Department. The cruisers following in order are vessels which, with the exception of the *Cincinnati* and *Raleigh*, would be of little use during war, except for scouting duties near the coast, but are very useful in time of peace. They have not a double bottom, and carry only light fore-and-aft sail.

Of late years foreign governments have built a number of torpedo-cruisers or gunboats, whose rôle is the destruction of torpedo-boats, torpedo-attack on a battle-ship, and scouting for a fleet. They range in size from 500 to 1,000 tons, and in speed from 18.5 to 21.5 knots, and carry a powerful armament of torpedoes, and a sufficient number of rapid-fire guns to protect themselves from an attack by torpedo-boats. We have no vessels of this character, the only one approaching them being the dynamite cruiser *Vesuvius*, which could be converted into a torpedo-gunboat at moderate cost.

Experience of foreign governments with torpedo-boats of about 120 feet length and smaller has demonstrated that they cannot be depended upon to render that assistance to a fleet which might be expected of such vessels; and so, during 1895 and 1896, a large number of similar boats, called "torpedo-destroyers," were built in Great Britain, whose length is 200 feet and upward, displacement from 200 to 300 tons, and speed from 27 to 30 knots. To get this phenomenal speed, it is necessary to use the lightest kind of construction, both in hull and machinery, to supply steam from water-tube boilers and to reduce the stores and outfit to a minimum. As completed, they are marvels of the skill of the naval architect and marine engineer; but they are little more than racing-machines, whose life depends upon the exercise of unceasing care and the greatest possible amount of attention. Their battery consists of one 12-pounder, five 6-pounders and two torpedo tubes or guns mounted on deck. Their

rôle is the same as that of torpedo-boats, and, in addition, the destruction of the latter, which they are able to accomplish, on account of their greater size and speed and their more powerful battery. As yet we have no boats as large as these, but our latest designs of torpedo-boats are for vessels of considerable size and speed.

The development of our torpedo-boats is illustrated in the table, where they are given in order of their design.

There is another vessel in our navy whose rôle will be unique in time of war. That is the ram *Katahdin*, constructed on the general idea of Admiral Ammen of the navy. She carries no heavy guns at all,—only a few rapid-fire ones, intended to repel attacks of torpedo-boats,—and her sole weapon of offense is a ram. While all our ships are built with a ram bow, none of them have been designed with a view specially to ramming, as has the *Katahdin*. She is very strongly built, has exceptional maneuvering power, on account of her keel being somewhat like an ellipse in contour, and when under way is scarcely visible, except for her smoke-pipe and wheel-house. Her deck is curved "turtle-back," and is armored heavily, so that she can withstand considerable attack. Her speed is something over 16 knots, which is well above the speed of most foreign battle-ships when in seagoing condition.

Of the old wooden vessels of the navy with steam-power, only a few remain in service, and they will probably not be of use for more than three or four years longer.

Besides the vessels given in the table, the navy has 12 tugs, 9 wooden steamers which are unfit for any service, and 6 wooden sailing-vessels which are used for receiving-ships at navy-yards and by the naval militia of some of the states.

Yards. There are navy-yards at Portsmouth, New Hampshire; Boston, Massachusetts; Brooklyn, New York; League Island, Pennsylvania; Norfolk, Virginia; Mare Island, California; and Washington, District of Columbia; and naval stations at Newport, Rhode Island; New London, Connecticut; Port Royal, South Carolina; Key West and Pensacola, Florida; and at Puget Sound, Washington—each under the command of a line officer. The navy-yards have facilities for the repair of hulls and machinery of ships, and the naval stations only for minor repairs and for the care of stores. The Washington navy-yard is now principally an establishment for the manufacture of guns and gun-mountings.

The naval station at Newport includes the torpedo-station, which is under the Bureau of Ordnance, the training-station for apprentices, which is under the Bureau of Navigation, and the Naval War College, which is under the Secretary's office.

The naval proving-ground for the test of armor and guns is at Indian Head, Maryland, and is under the Bureau of Ordnance.

The Museum of Hygiene in Washington is under the Bureau of Medicine and Surgery.

The personnel of the active list of the navy, Jan. 1, 1896, included 6 rear-admirals, 10 commodores, 45 captains, 85 commanders, 74 lieutenant-

ARMORED SHIPS.

	LENGTH.	BREADTH.	MEAN DRAFT.	DISPLACEMENT.	INDICATED HORSE-POWER.	SPEED.	ARMOR.			MAIN BATTERY.	TORPEDO-TUBES.
							Side.	Turret.	Barbette.		
<i>Battleships:</i>	<i>Fect.</i>	<i>Fect.</i>	<i>Fect.</i>	<i>Tons.</i>		<i>Knots.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>		
Indiana-----	348	69.25	24	10,288	9,738	15.55	18	15-6	17-6	4 13", 8 8", 4 6"	6
Iowa-----	360	72.2	24	11,410	11,000	16.5	14	15-5	15-6	4 12", 8 8", 6 4"	5
Kearsarge-----	368	72.4	23.5	11,525	10,000	16	15-10	17-9	15-12	4 13", 4 8", 14 5"	5
Kentucky-----	368	72.4	23.5	11,525	10,000	16	15-10	17-9	15-12	4 13", 4 8", 14 5"	5
Maine-----	318	57	21.5	6,682	9,293	17	12	8	12-10	4 10", 6 6"	4
Massachusetts-----	348	69.25	24	10,288	10,400	16.2	18	15-6	17-6	4 13", 8 8", 4 6"	6
Oregon-----	348	69.25	24	10,288	11,111	16.79	18	15-6	17-6	4 13", 8 8", 4 6"	6
Texas-----	301.3	64.1	22.5	6,315	8,600	17	12	12	----	2 12", 6 6"	4
<i>Monitors:</i>											
Amphitrite-----	259.5	55.8	14.5	3,990	1,600	12	9-5	7 1/2	11 1/2	4 10", 2 4"	None.
Miantonomoh-----	259.5	55.8	14.5	3,990	1,600	12	7	11 1/2	----	4 10"	None.
Monadnock-----	259.5	55.8	14.5	3,990	3,000	13	9-5	7 1/2	11 1/2	4 10", 2 4"	None.
Monterey-----	256	59	14.8	4,084	5,244	13.6	13-6	8-7 1/2	13-11 1/2	2 12", 2 10"	None.
Puritan-----	289.5	60.1	18	6,060	3,700	12.4	14-6	8	14	4 12", 6 4"	None.
Terror-----	259.5	55.8	14.5	3,990	1,600	12	7	11 1/2	----	4 10"	None.
<i>Ram:</i>											
Katahdin-----	250.8	43.4	15	2,155	5,068	16.1	6	----	----	Ram.	None.
<i>Armored Cruisers:</i>											
Brooklyn-----	400.5	64.7	24	9,271	18,770	21.91	3	5 1/2	8-4	8 8", 12 5"	5
New York-----	380.5	64.8	23.3	8,200	17,400	21	4	5 1/2	10	6 8", 12 4"	3

	LENGTH.	BREADTH.	MEAN DRAFT.	DISPLACEMENT.	INDICATED HORSE-POWER.	SPEED.	ARMOR.		MAIN BATTERY.
							Side.	Turret.	
<i>Single Turret Monitors.</i>	<i>Fect.</i>	<i>Fect.</i>	<i>Fect.</i>	<i>Tons.</i>		<i>Knots.</i>	<i>Inches.</i>	<i>Inches.</i>	
Ajax-----	225	43.7	13.5	2,100	340	6	5	10	2 15"
Comanche-----	200	46	11.5	1,875	340	6	5	11	2 15"
Canonicus-----	225	43.7	13.5	2,100	340	6	5	10	2 15"
Catskill-----	200	46	11.5	1,875	340	6	5	11	2 15"
Jason-----	200	46	11.5	1,875	340	6	5	11	2 15"
Lehigh-----	200	46	11.5	1,875	340	6	5	11	2 15"
Mahopac-----	225	43.7	13.5	2,100	340	6	5	10	2 15"
Manhattan-----	225	43.7	13.5	2,100	340	6	5	10	2 15"
Montauk-----	200	46	11.5	1,875	340	6	5	11	2 15"
Nahant-----	200	46	11.5	1,875	340	6	5	11	2 15"
Nantucket-----	200	46	11.5	1,875	340	6	5	11	2 15"
Passaic-----	200	46	11.5	1,875	340	6	5	11	2 15"
Wyandotte-----	225	43.7	13.5	2,100	340	6	5	10	2 15"

commanders, 250 lieutenants, 75 lieutenants (junior grade), and 170 ensigns, or a total of 715 line officers; 15 medical directors, 15 medical inspectors, 50 surgeons, 56 passed assistant surgeons and 22 assistant surgeons, or a total of 158 medical officers; 13 pay-directors, 13 pay-inspectors, 40 paymasters, 20 passed assistant paymasters and 10 assistant paymasters, or a total of 96 pay officers; 70 chief engineers, 66 passed assistant engineers and 37 assistant engineers, or 173 engineer officers; 24 chaplains—making a total of officers of the seagoing corps of 1,066. There are, besides, 12 professors of mathematics, 32 naval constructors and assistant constructors, 12 civil engineers, or, in all, 1,122 commissioned officers. There are 129 warrant-officers, comprising 34 boatswains, 38 gunners, 39 carpenters, and 18 sailmakers and 21 mates. There are thus 1,272 officers of all kinds on the active list. Promotion in all corps is by seniority, after passing a physical and a professional examination.

There is a retired list, composed of officers who have reached the age of 62 years, or who have been placed on it for physical disability resulting from causes incident to the naval service, or upon their

own application after 40 years of service. Officers so retired receive 75 per cent of their sea-pay.

There are on the retired list 36 rear-admirals, 8 commodores, 9 captains, 15 commanders, 25 lieutenant-commanders, 43 lieutenants, 11 lieutenants (junior grade) and 11 ensigns, or 158 line officers; 16 medical directors, 7 medical inspectors, 13 surgeons, 8 passed assistant surgeons and 6 assistant surgeons, or 50 medical officers; 5 pay-directors, 4 pay-inspectors, 9 paymasters, 1 passed assistant paymaster and 2 assistant paymasters, or 21 pay-officers; 40 chief engineers, 35 passed assistant engineers and 29 assistant engineers, or 104 engineer officers; 4 chaplains—making 333 retired officers of the seagoing corps. Of the other officers on the retired list, there are 3 professors of mathematics, 4 naval constructors, 1 civil engineer, 17 boatswains, 28 gunners, 18 carpenters, 13 sailmakers and 3 mates, making a grand total of 420 retired officers.

The number of enlisted men allowed by law is 10,000, and of apprentices 750. The period of enlistment is three years for men, and during minority for apprentices, who are enlisted, with the consent of their parents or guardians, between the ages of 14

UNARMORED VESSELS.

	LENGTH.	BREADTH.	MEAN DRAFT.	DISPLACEMENT.	INDICATED HORSE-POWER.	SPEED.	GUNS.	TORPEDO-TUBES.
Alert	175	32	12.75	1,020	500	11	2 9"	None.
Atlanta	271.3	42.1	16.83	3,000	4,000	15.6	6 6", 2 8"	None.
Baltimore	327.5	48.6	19.5	4,413	10,064	20	4 8", 6 6"	4
Bancroft	187.5	32	12.2	838	1,213	14.4	4 4"	2
Bennington	230	36	14	1,710	3,436	16.5	6 6"	6
Boston	271.3	42.1	16.83	3,000	4,030	15.6	2 8", 6 6"	---
Castine	204	32.1	12	1,177	2,200	16	8 4"	1
Charleston	312.6	46.2	18.6	3,730	6,666	18.2	2 8", 6 6"	4
Chicago	325	48.2	19	4,500	9,000	19	4 8", 8 6", 2 5"	---
Cincinnati	300	42	18	3,213	10,000	20	1 6", 10 5"	4
Columbia	412	58.2	22.5	7,375	18,509	22.8	1 8", 2 6", 8 4"	4
Concord	230	36	14	1,710	3,405	16.5	6 6"	6
Detroit	257	37	14.6	2,089	5,227	18.7	9 5"	3
Dolphin	240	32	14.3	1,486	2,253	15.5	2 4"	---
Gunboat No. 10 (Annapolis)	168	36	12	1,000	800	12	6 4"	None.
Gunboat No. 11 (Vicksburg)	168	36	12	1,000	800	12	6 4"	None.
Gunboat No. 12 (Newport)	168	36	12	1,000	800	12	6 4"	None.
Gunboat No. 13 (Princeton)	168	36	12	1,000	800	12	6 4"	None.
Gunboat No. 14 (Wheeling)	174	34	12	1,000	800	12	6 4"	None.
Gunboat No. 15 (Marietta)	174	34	12	1,000	800	12	6 4"	None.
Helena	250.7	40.1	9	1,392	1,600	13	8 4"	1
Machias	204	32.1	12	1,177	2,046	15.5	8 4"	1
Marblehead	257	37	14.6	2,089	5,451	18.4	9 5"	3
Montgomery	257	37	14.6	2,089	5,580	19	9 5"	3
Michigan	163.3	27.1	9.0	685	300	10.5	4 30-pdr.	None.
Minneapolis	412	58.2	22.5	7,375	20,862	23.1	1 8", 2 6", 8 4"	4
Monocacy	255	35	9	1,370	750	11	4 8"	None.
Nashville	220	38.3	11	1,371	1,750	14	8 4"	1
Newark	310	49.2	18.8	4,098	8,869	19	12 6"	6
Olympia	340	53	20.7	5,586	17,313	21.7	4 8", 10 5"	6
Petrel	176.3	31	11.6	892	1,095	11.8	4 6"	None.
Philadelphia	327.5	48.6	19.2	4,324	8,815	19.7	12 6"	4
Pinta	137	26	10	550	250	9	2 12-pdr.	None.
Raleigh	300	42	18	3,213	10,000	20	1 6", 10 5"	4
Ranger	175	32	12.8	1,020	500	11	2 9", 1 8"	None.
San Francisco	310	49.2	18.8	4,098	9,913	19.5	12 6"	4
Vesuvius	252.3	26.5	10.6	929	3,795	21.4	3 15"	None.
Wilmington	250.7	40.1	9	1,392	1,600	13	8 4"	None.
Yorktown	230	36	14	1,710	3,392	16.5	6 6"	6

TORPEDO-BOATS.

	LENGTH.	BREADTH.	MEAN DRAFT.	DISPLACEMENT.	INDICATED HORSE-POWER.	SPEED.	TORPEDO-TUBES.
Stiletto	88.5	11	3	31	359	18.2	---
Cushing	138.8	14.3	4.9	105	1,720	22.5	3
Ericsson	149.6	15.6	4.8	120	1,800	24	3
No. 3	160	16	5	142	2,000	24.5	3
No. 4	160	16	5	142	2,000	24.5	3
No. 5	160	16	5	142	2,000	24.5	3
No. 6	175	17	5.5	---	---	27.5	3
No. 7	175	17	5.5	---	---	27.5	3
No. 8	170	17	5.5	182	3,200	26	3
Submarine	85.3	11.5	---	168	1,200	8	2

WOODEN VESSELS.

	LENGTH.	BREADTH.	MEAN DRAFT.	DISPLACEMENT.	INDICATED HORSE-POWER.	SPEED.	GUNS.
<i>Steamers:</i>							
Adams	185	35	14.3	1,375	800	11	---
Alliance	185	35	14.3	1,375	800	11	6 4"
Enterprise	185	35	14.3	1,375	800	11	4 32-pdr.
Essex	185	35	14.3	1,375	800	11	6 4"
Hartford	225	44	18.2	2,790	2,000	12	13 5"
Lancaster	235.7	46	19.2	3,250	1,100	10	12 5"
Marion	216	37	16.5	1,900	1,000	11	---
Mohican	216	37	16.5	1,900	1,000	11	8 9", 1 8"
Theis	166	30.3	18	1,250	535	9.3	---
Yantic	180	30	12.2	900	310	8.5	2 9", 1 8"
<i>Sailing Vessels:</i>							
Constellation	176	42	20	1,186	---	---	8 8"
Jamestown	163.5	36	16	1,150	---	---	---
Monongahela	223	38	16.5	2,100	---	---	4 8"
Portsmouth	153	38.3	16.5	1,125	---	---	2 8", 1 60-pdr.
Saratoga	147.5	36.1	16	1,025	---	---	---
St. Marys	150	37.5	15.5	1,025	---	---	---

and 17. After 20 years' continuous service enlisted men may, with the approval of the Department, be assigned to duty on receiving-ships at navy-yards, and in other duty not requiring long absence from home; after 30 years' service they may be admitted to the Naval Home.

Officers of the navy are detailed for duty in the Coast Survey, the Lighthouse Service and in the Fish Commission, although those services are under the Treasury Department.

The marine corps, which is under the Navy De-

partment, comprises 76 officers on the active list and 2,100 enlisted men, all under the direction of a colonel commandant with headquarters at Washington. There are 22 officers on the retired list. The

period of enlistment in the marine corps is five years, and the pay and allowances the same as in the army. The duties of the corps are the general police of navy-yards and stations, and of ships in commission, as well as duty at the guns. G. W. MELVILLE.

NAVY OF THE UNITED STATES, ORGANIZATION AND ADMINISTRATION OF. See NAVY, in these Supplements.

NAVY DEPARTMENT, a state department presided over by a Secretary, who is a member of the Cabinet, appointed by the President and confirmed by the Senate for a term of four years, or at the pleasure of the President. The Secretary is assisted by an assistant secretary, similarly appointed and under the same rule as regards tenure of office. The technical work of the department is distributed among eight bureaus, as follows, the chief of each having the relative rank of commodore while holding the office.

Yards and Docks, presided over by a line officer. Duties: Construction and maintenance of docks, wharves, cranes, etc., buildings, except hospitals and magazines, and generally all civil-engineering work in the navy-yards.

Navigation, presided over by a line officer. Duties: Personnel of the navy, including the education of officers and men, enlistment of men and apprentices, movements of ships and fleets, and hydrographic work.

Equipment, presided over by a line officer. Duties: Manufacture of ropes, anchors and cables, rigging and cooking utensils, installation and repair of electric-lighting apparatus on board ship, purchase of coal, control of Naval Observatory and *Nautical Almanac* office.

Ordnance, presided over by a line officer. Duties: Manufacture and charge of guns, torpedoes and ammunition; charge of torpedo stations and magazines; design of turrets and distribution of armor and armament on board ship.

Construction and Repair, presided over by a naval constructor, with the title of chief constructor. Duties: Design, building and repair of hulls of ships and small boats, securing armor and turrets, ventilation of ships, etc.

Steam-Engineering, presided over by a chief engineer, with the title of engineer-in-chief. Duties: Design, building and repair of machinery for the propulsion of ships and for auxiliary purposes, turret machinery, etc.

Medicine and Surgery, presided over by a naval surgeon, with the title of surgeon-general. Duties: Design, erection and maintenance of hospitals, management of them and of laboratories and dispensaries; purchase of medicine.

Supplies and Accounts, presided over by a pay-officer, with the title of paymaster-general. Duties: Purchase and supply of all provisions and stores, except medicine, and the accounts relating thereto.

The chiefs of the bureaus of yards and docks, ordnance, equipment, construction and repair, and steam-engineering, and the chief intelligence officer constitute a Board on Construction, to which is referred questions relating to the general design of ships.

The office of *Naval Intelligence* is a branch of the Secretary's office, and is presided over by a line officer. Its duties are the collection of information regarding foreign navies.

A judge advocate-general is attached to the Secretary's office, and to him are referred all questions involving law and regulations, and especially those relating to courts-martial and to the promotion and retirement of officers. The office may be held by any officer of the navy or marine corps.

The active list of rear-admirals and commodores Jan. 1, 1897, with duty or station, follows. Rear-admirals—George Brown, commandant navy-yard, Norfolk; John G. Walker, chairman Lighthouse Board; Francis M. Ramsay, chief Bureau of Navigation; William A. Kirkland, commandant navy-yard, Mare Island; Lester A. Beardslee, commanding Pacific station; Thomas O. Selfridge, commanding European station. Commodores—J. N. Miller, commandant navy-yard, Boston; M. Sicard, commandant navy-yard, Brooklyn; E. O. Matthews, chief Bureau of Yards and Docks; C. S. Norton, commandant navy-yard, Washington; L. Phythian, superintendent Naval Observatory; R. R. Wallace, commandant naval station, Newport; F. M. Bunce,* commanding North Atlantic station; F. V. McNair,* commanding Asiatic station; J. A. Howell, commandant navy-yard, Washington; G. Dewey, president Board Inspection and Survey.

A list of Secretaries of the Navy follows: George Cabot, 1798; Benjamin Stoddert, 1798; Benjamin Stoddert, 1801; Robert Smith, 1801; Jacob Crowninshield, 1805; Paul Hamilton, 1809; William Jones, 1813; B. W. Crowninshield, 1814; B. W. Crowninshield, 1817; Smith Thompson, 1818; Samuel L. Southard, 1823; Samuel L. Southard, 1825; John Branch, 1829; Levi Woodbury, 1831; Mahlon Dickerson, 1834; Mahlon Dickerson, 1837; James K. Paulding, 1838; George E. Badger, 1841; Abel P. Upshur, 1841; David Henshaw, 1843; Thomas W. Gilmer, 1844; John Y. Mason, 1844; George Bancroft, 1845; John Y. Mason, 1846; William B. Preston, 1849; William A. Graham, 1850; John P. Kennedy, 1852; James C. Dobbin, 1853; Isaac Toucey, 1857; Gideon Welles, 1861; Gideon Welles, 1865; Adolph E. Borie, 1869; George M. Robeson, 1869; Richard W. Thompson, 1877; Nathan Goff, Jr., 1881; William H. Hunt, 1881; William E. Chandler, 1882; William C. Whitney, 1885; Benjamin F. Tracy, 1889; Hilary A. Herbert, 1893; John D. Long, 1897.

G. W. MELVILLE.

NEAGH, LOUGH, a lake in the province of Ulster, Ireland, 17 miles long and 10 broad; receives the Upper Bann and the Blackwater from the south, and its waters find an outlet to the Atlantic Ocean by the Lower Bann.

NEAGLE, JOHN, an American portrait-painter; born in Boston, Massachusetts, in 1799. He was apprenticed to a coach-painter in Philadelphia and received only three months' instruction from Peter Ancora, a drawing-teacher, and in 1818 determined to devote himself to portrait-painting. In 1826 he painted the celebrated full-size portrait of *Patrick*

* Have the rank of rear-admiral while in command of the stations named.

Lyon, the Blacksmith, which is now in the Pennsylvania Academy of Fine Arts at Philadelphia. Among his most notable portraits are *Washington*, in Independence Hall; *Henry Clay*, in the Union League Club; *Matthew Carey*; *Dr. Theodore Parker*; *Gilbert Stuart*; *Bishop Meade of Virginia*; and *Judge Sharswood*. As a painter he was a powerful colorist, a skillful delineator of character, and a vigorous draftsman. He died in Philadelphia, Pennsylvania, in 1865.

NEAL, DAVID DOLLOFF, an American figure-painter; born in Lowell, Massachusetts, in 1837. In 1862 he went to Munich, where he studied under Aimüller, and afterward under Piloty. Among his earlier works are *Chapel of the Nonnberg Convent, Salzburg* (1864); *Chapel of the Kings at Westminster*; *The Interior of St. Marks, Venice*; and *On the Canal, Venice*. His best-known work is *The First Meeting of Queen Mary Stuart and Rizzio*. When it was exhibited in 1876, it was awarded the grand medal of the Bavarian Academy. Among his other pictures are *Retour de la Chasse*; *James Watt*; *The Burgomaster*; and *Oliver Cromwell Visits John Milton* (1883). He lived mostly at Munich, but exhibited in London and New York City.

NEANDERTHAL, a wild, romantic valley between Düsseldorf and Elberfeld, in Rhenish Prussia. In a limestone cave in this valley was found, in 1857, the skeleton of a prehistoric man, and the peculiar formation of the skull induced several archæologists to regard it as typical of a separate race of ancient cave-dwellers. Authorities explain the abnormality as caused by disease during the lifetime of the individual.

NEB—NEB, the native name of the pods of certain Oriental species of *Acacia* which yield tannic acid and hence are of service in tanning. See also *ACACIA*, Vol. I, p. 68.

NEBO, MOUNT. See *PALESTINE*, Vol. XVIII, p. 173. A mountain in *UTAH*; q.v., Vol. XXIV, p. 19.

NEBRASKA has an area of 77,510 square miles, of which 670 are water surface, leaving 76,840 square



STATE SEAL OF NEBRASKA.

miles, or 49,177,600 acres, of land surface. The state had long been known as the Blackwater State, when the legislature, in 1895, by joint resolution, provided that Nebraska should thereafter, in a popular sense, be known and referred to as the "Tree-Planters' State," and declaring that the flower known as the goldenrod should be the floral emblem of the state.

The population in 1890 was 1,058,910, that of 1880 was 452,402, the gain of 606,508 for the ten years making an increase of 134.06 per cent. The relative position among the states in 1880 was thirtieth, that of 1890 was twenty-sixth, and a gain in density of population within the same period was made, from 5.94

to the square mile to 13.78. In 1890 there were eight cities in Nebraska having a population of 8,000 and upward, in which resided 259,048 of the inhabitants of the state, constituting 24.46 per cent of the entire population. The relative proportion of males to females was 572,824 to 486,086. The percentage of native-born citizens was 80.87; the number of negroes within the state, 8,913,—an increase of 6,528 over the number in 1880.

Nebraska is pre-eminently an agricultural state, and holds a high rank in the production of almost all farm products. The following table, compiled from the census reports of 1890, shows the relative standing of Nebraska among the states in the production of the cereals, the percentages being that of the entire crop of the United States:

PRODUCT.	ACRES.	PER CENT.	RANK.	BUSHEL.	PER CENT.	RANK.
All cereals--	7,961,969	5.68	5th	273,337,889	7.77	4th
Corn-----	5,480,279	7.60	5th	215,895,996	10.17	4th
Wheat-----	798,855	2.38	14th	10,571,059	2.26	14th
Oats-----	1,503,515	5.31	6th	43,843,640	5.42	6th
Barley-----	82,590	2.56	9th	1,822,111	2.33	7th
Rye-----	81,372	3.75	8th	1,085,083	3.82	9th
Buckwheat--	15,358	1.83	8th	120,000	0.99	11th

During the decade 1880–90 Nebraska passed ten states that had a larger cereal acreage in 1880, and took the fifth place. The growth of all agricultural interests during the period mentioned was very marked. The number of acres of farm-lands was increased over 11,000,000 acres; the number of acres of meadow-land mown for hay increased 1,945,376; the number of swine was increased by over 2,000,000; the number of milch cows was increased 343,858, or 213.33 per cent; the number of "other cattle" on farms received an addition of 1,041,655.

Nebraska stood fourth in the acreage of flax, third in the production of hemp and made an excellent showing in hay, potatoes and broom-corn. The census reports showed 113,608 farms, of an average size of 190 acres and aggregating 21,593,444 acres. The number in 1880 was only 63,387, in 1870 only 12,301, and in 1860 there was but 2,789 farms in the entire territory now embraced in the limits of the state. The total value of lands, fences, buildings, machinery, implements and live-stock was given at \$511,789,810; the number of horses, 626,789; mules, 46,512; neat cattle, 2,142,597; swine, 3,815,647, and the number of sheep, 209,243.

Beginning with 1890 the culture of the beet-root for the purpose of sugar-making became a recognized industry of importance. Up to 1896, 27,417,200 pounds of sugar had been made from the beets raised in Nebraska, the producers of the beet-roots receiving, in addition to an average of about five dollars per ton from the sale of the crop, a bounty from the state, paid in 1891 and 1895, of \$61,067, and a bounty paid by the general government, paid in 1892, 1893 and 1894, of \$249,724, making a total bounty of \$310,791. That the business is a profitable one for the agriculturist is proven by the fact that the industry has increased within the six crop seasons from 1,400,000 pounds of sugar in 1890 to

about 9,000,000 pounds in 1895. Alfalfa is considered one of the most profitable of the plant crops raised in Nebraska, and is becoming more widely raised throughout the state.

Stock-raising has been an important and profitable industry from the time of the earliest settlement of Nebraska. Statistics are not available as to the total shipments of stock, but to the single stockyards of South Omaha in 1894 there were shipped 829,171 head of cattle, 1,904,238 head of hogs, 252,218 head of sheep and 8,122 horses and mules. Dairy-farming has taken a strong hold in Nebraska, and has increased more than 500 per cent in the value of products marketed during the decade 1885-95.

One of the greatest aids to successful farming in many parts of the state is irrigation. In 1895, 2,219 miles of irrigating-canals were in operation, the cost of construction was \$2,750,000, the number of acres covered was 1,061,017, and the estimated increase in land value by reason of the work was \$9,061,440. Under the new law which went into effect in 1895, proposed irrigation was entered with the state board of irrigation to the extent of 2,111 miles of canals, estimated to cost \$6,209,285; the number of acres to be covered was 2,367,689, and the increase in land values was estimated at \$18,941,512. The water is abundant for irrigation purposes in the greater part of the state where it is required, and legislation favorable to the work is passed by each succeeding legislature. (See IRRIGATION, in these Supplements).

Fruit-growing has become, of late years, an important agricultural industry. Apples, especially, thrive in all parts of the state, and there is no county without apple orchards. Grapes, plums and cherries make large returns, as do the small fruits, strawberries, raspberries and blackberries. A report made in 1894 showed the number of fruit trees in the state to be 3,680,447 and the number of grapevines 1,260,918.

Although popularly believed to be almost without timber, Nebraska has some very fine pine, red cedar, white oak, hickory, black walnut and poplar. A resolution of the legislature, calling for facts on the timber-supply of the state, resulted in a report being made by counties in 1894, which placed the number of forest trees in the state at 61,807,769. The cottonwood, probably the largest tree of the state, grows in all sections, as does the white elm. Much attention is being given to planting quick-growing timber, among which the cottonwood takes the lead. Interest is stimulated in this matter by the legislative christening of the state, referred to heretofore in this article. The report of the state botanist gives the number of trees indigenous to Nebraska at 62, and the number of shrubs at 69.

The census returns of 1890 showed 3,014 specified manufacturing industries, which had an aggregate capital of \$37,569,508; employing 23,876 hands, to whom \$12,984,571 were paid as wages, and turning out \$93,037,794 worth of finished products. The leading industry was slaughtering and meat-packing, wholesale, which yielded a revenue of \$24,026,876. Other important branches of manufacturing

were flouring and grist mill products, brick and tile, car and general shop construction, lumber and planing-mill products, cheese, butter and condensed milk, and saddlery and harness.

The report of the state auditor for 1895 shows the total railroad mileage in Nebraska for the



CAPITOL BUILDING, LINCOLN.

year ending June 30, 1895, to have been 5,618. The total assessed valuation of the entire number of roads amounted to \$27,939,178. The telegraph lines of the state had in operation 2,973 miles, which were assessed at \$192,324. The sleeping and dining cars operated within the state were assessed at \$75,190.

The state banking board reported, for the year 1895, 447 commercial and savings banks in operation in Nebraska, with an aggregate authorized capital stock of \$9,216,525. During the preceding year 11 new banks were organized, and 46 discontinued business. The banks still continuing in business reported resources and liabilities to the amount of \$26,764,226, general deposits of \$14,200,775, undivided profits of \$1,229,848, and loans and discounts outstanding to the amount of \$19,085,793. About 130 national banks were doing business in the state, whose combined capital was approximately \$12,000,000. At the close of 1895 there were 84 building and loan associations in the state, whose combined assets amounted to \$3,924,778; their paid-in capital stock, \$2,744,413; and who received as interest for the year \$505,182.

The statistics for the school year ending July 8, 1895, were as follows: Number of children in the state between the ages of 5 and 21 years of age, 351,846; enrollment, 272,290; pupils over 21, 886; under 5 years of age, 1,106; total number enrolled in the public schools, 274,282. The number of school districts in the state was 6,693; the number of schoolhouses, 6,687; the number of teachers 9,491, of whom 2,548 were males and 6,943 were females; the average monthly wages paid to males \$44.18, to females \$38.66. The value of the school property of the state was \$8,889,841, divided as follows: Schoolhouses, \$6,229,102; sites, \$1,642,594; text-books, \$443,609; apparatus, maps, charts, etc., \$330,514; and other property, \$244,020. The receipts of the school fund for the year, including the amount on hand at the beginning of the fiscal term, were \$4,241,231; the total expenditures, \$3,-

766,216. Of this expense, the largest item was the amount paid to teachers, which was \$2,435,342. The number of new schoolhouses built during the year was 189, costing, for the buildings and sites, the sum of \$238,944. There were enrolled in the different institutes held during the year, 8,843 teachers, and 149 instructors were engaged, which cost the sum of \$20,557. In addition to the public schools, there were 212 private schools. Among the institutions of higher education in Nebraska, the State University (q.v., in these Supplements) stands at the head. The Nebraska Wesleyan University is also a flourishing institution; the voluntary subscriptions made in 1895 extinguished a debt of \$50,700. The Presbyterian Church controls the University of Omaha, located at Bellevue; the Christian Church, the Cotner University, at Bethany; the Seventh-Day Adventists, the Union College, at College View; the Congregational Church, Doane College, at Crete; the Christian Church, Fairfield College, at Fairfield; the Congregationalist Church, Gates College, at Neligh; the Roman Catholic Church, Creighton University, at Omaha; the Methodist Episcopal Church, the Nebraska Wesleyan University, at University Place; and the United Brethren, York College, at York.

The receipts of the state treasurer for the biennial period ending Nov. 30, 1894, were \$4,408,613; the disbursements for the same period amounted to \$4,468,312. The cash on hand at the time mentioned was \$880,025. The total state debt reported Dec. 1, 1894, was \$1,157,805. The total valuation of all property for the purposes of taxation in 1895 was \$183,717,498, the total state levy, in mills, being 6.84.

At the beginning of 1895 the National Guard of Nebraska consisted of one brigade, composed of two regiments of infantry, one battery of light artillery and one troop of cavalry. The total strength, officers and enlisted men, was 1,202. The infantry is armed with Springfield rifles; the artillery has two Rodman guns; the cavalry carries carbines. Twelve independent commands are located at different points within the state. The authorized strength of the guard is 2,000, and within the state there are 135,000 persons liable to military duty. The appropriation of \$30,000 in 1895 was supplemented by a Federal appropriation of about \$7,000, mainly in supplies and equipment.

Nebraska had, in 1890, 2,797 church organizations, 1,822 edifices, a membership of 194,466, which is 18.36 per cent of the population, and church property of the value of \$6,443,689.42. Organizations were represented, of which the following were the most prominent, in point of numbers: The Baptists, all bodies, 284; Roman Catholics, 213; Congregationalists, 172; all Lutheran bodies, 387; all Methodists, 738; all Presbyterians, 278; Protestant Episcopalians, 110; and United Brethren, 176.

The charitable, correctional and penal institutions of Nebraska are given in the following column, together with their location, number of inmates at the beginning of 1895, and the cost of maintenance for the years 1893 and 1894:

INSTITUTION.	LOCATION.	INMATES	MAINTENANCE.
State Penitentiary---	Lancaster.	351	\$106,580
Nebraska Hospital for the Insane-----	Lincoln.	341	128,000
Asylum for the Incurable Insane----	Hastings.	447	134,000
Norfolk Hospital for the Insane-----	Norfolk.	191	69,272
Institution for Feeble-minded Youth-	Beatrice.	191	72,000
Institution for the Blind-----	Nebraska City.	105	49,000
Institute for the Deaf and Dumb-----	Omaha.	186	42,000
Soldiers' and Sailors' Home-----	Grand Island.	210	17,000
State Industrial Sch'l	Kearney.	219	84,000
Nebraska Industrial Home-----	Milford.	52	25,000
Girls' Industrial Sch'l	Geneva.	80	40,000

On Jan. 1, 1896, there were 649 newspapers published in Nebraska. One or more papers were published in each of the 90 counties of the state, in 339 of the cities, towns and villages, of which 90 were county seats. Of the whole number of papers published, 29 were daily, 3 triweekly, 11 semi-weekly, 570 weekly, 2 fortnightly, 4 semimonthly, 29 monthly, and 1 bimonthly.

The following are the principal cities of Nebraska, with the populations as given in the census of 1890:

Omaha-----	140,452	Plattsmouth-----	8,392
Lincoln-----	55,154	Kearney-----	8,074
Beatrice-----	13,836	South Omaha-----	8,062
Hastings-----	13,584	Grand Island-----	7,536
Nebraska City----	11,494	Fremont-----	6,747

The following is a list of the governors of Nebraska since the date of the admission of the state into the Union, together with their respective terms of office: David Butler, 1867-71; William H. James, 1871-73; Robert W. Furness, 1873-75; Silas Garber, 1875-79; Albinus Nance, 1879-83; James W. Dawes, 1883-87; John M. Thayer, 1887-91; James E. Boyd, 1891-93; Lorenzo Crouse, 1893-95; Silas A. Holcomb, 1895. See also NEBRASKA, Vol. XVII, pp. 306-309.



LIBRARY, UNIVERSITY OF NEBRASKA.

NEBRASKA, UNIVERSITY OF, a co-educational institution for higher learning, situated at Lincoln, maintained and controlled by the state. It was founded by an act of the legislature in 1869. The Agricultural College is one of the departments of

the university; other departments are the colleges of arts and sciences, law, medicine, engineering and fine arts. The institution is governed by a board of six regents, elected by popular vote, and holding office for six years. Tuition is practically free, small fees being charged in the various laboratories. The first classes were organized in 1871. In 1896 there were 1,506 students in attendance, with 115 instructors and a library of 32,000 volumes. In 1895 the income from all sources was \$272,250. By act of the legislature a tax of three eighths of a mill per dollar is provided for the support of the university. In addition to this there are revenues from land leases and sales under the Congressional grant of 1862 and the Morrill Fund Act for Agricultural Stations of 1890.

NEBRASKA CITY, a town of Otoe County, southeastern Nebraska, 47 miles E. of Lincoln and 42 miles S. of Omaha, on the Missouri River, and on the Burlington and Missouri River and the Missouri Pacific railroads. The river here has two arms, which are crossed by a steel railway bridge constructed at a cost of over \$1,000,000. Its industrial establishments include several pork-packing houses and large stock-yards, canneries and agricultural-implement factories, besides cologne, spirits and alcohol distillery, several breweries, vitrified brick-works, boiler-shops, marble-yards, plow and wagon factories and lumber-yards. Corn is largely raised in the region around. The Nebraska Wesleyan University (Methodist Episcopal), organized in 1888, is located here, with 19 instructors, 402 pupils and a library of 2,000 volumes. Population 1890, 11,494.

NEBULÆ. See ASTRONOMY, Vol. II, pp. 820-822.

NECEDAH, village of Juneau County, central Wisconsin, 48 miles N.W. of Portage, and five miles W. of the Wisconsin River. It has a good lumber business, three saw-mills, a grist-mill and a pail factory. Population 1890, 1,708.

NECHES RIVER, a river which rises in Van Zandt County, eastern Texas, and flows about 350 miles S.E. to Sabine Lake, its waters passing thence by Sabine Pass into the Gulf of Mexico.

NECKAR, a river of Germany. See WÜRTEMBERG, Vol. XXIV, pp. 700, 701.

NECTONABES or NEKH-NEBF, two Egyptian monarchs. See EGYPT, Vol. VII, p. 744.

NEDJED or NEJD. See ARABIA, Vol. II, pp. 238-240.

NEEDLES are now made of many different sizes and shapes and applied to many different uses. The needle trade has become an important one, although less so in America than in Europe. In the tenth census, forty establishments were counted in America where pins and needles are made. Their total product was then valued at \$1,378,000. In 1890 there were 45 manufacturing establishments reported, with a product valued at \$1,515,865. See also NEEDLE, Vol. XVII, pp. 313, 314.

NEEDLES, THE, are three stacks of outlying rocks of chalk off the west end of the Isle of Wight, England. They derive their name from their peculiar shape. They are constantly subjected to the action of the waves, only three now appearing above

the water conspicuously, while there were formerly five. On the outer part of the outermost rock is the Needles lighthouse, in lat. 50° 39' N., long. 1° 34' W.

NEENAH, a city of Winnebago County, eastern Wisconsin, 40 miles W. of Manitowoc, on the Chicago and North-Western and the Wisconsin Central railroads, and on Fox River. It has five school-houses, a commercial college, three public parks and manufactories of flour, paper and stoves. It is a summer resort. Population 1890, 5,083.

NEGATIVE-MAKING. See PHOTOGRAPHY, in these Supplements.

NEGAUNEE, a city of Marquette County, north-central Michigan, eight miles W.S.W. of Marquette, on the Chicago and North-Western and the Duluth, South Shore and Atlantic railroads. The city is situated on Iron Mountain, at an elevation of nine hundred feet above the level of Lake Superior. The principal industries are those of iron-mining and lumbering. Population 1890, 6,078; 1895, 5,940.

NEGLIGENCE. See NEGLIGENCE, Vol. XVII, p. 315. As to liability of employers and employees for negligence, see EMPLOYERS' AND EMPLOYEES' LIABILITY, in these Supplements.

NEGOTIABLE INSTRUMENTS, that class of contracts, usually for the payment of money, which are capable of being transferred by indorsement or delivery, or both, and upon which the assignee thereof may maintain an action in his own name. As to the various kinds of instruments which compose the class of negotiable instruments, see BILL, Vol. III, p. 673; EXCHANGE, Vol. VIII, p. 784; BANKING, Vol. III, p. 315, and also in these Supplements. See also MERCANTILE LAW, in these Supplements.

NEGRI, ADA, an Italian poetess; born in Lodi, Lombardy, in 1871, of a peasant family. At the age of 18 she was able to become a teacher in the communal school in the hamlet of Matta-Visconti. She wrote verses which were published in two Milan journals, but they attracted little or no notice. However, when they were collected and published in 1892, under the title of *Fatalità*, they drew immediate attention to their author on account of their impassioned tone, their yearning for some condition of existence wherein the toil and moil of poverty could be left behind. The author obtained a substantial prize, awarded to Italian women who become noteworthy in literature, and received an appointment at the Normal School for Women in Milan, in the department of Italian literature.

NEGRI, CHRISTOPHE, an Italian economist; born in Milan, June 13, 1809; studied law at Pavia, Gratz and Vienna; was professor of constitutional law at Padua from 1841 to 1848; forced to leave Italy in 1848, he went to Turin and became rector of the university and chief consul in the bureau of foreign affairs. He traveled extensively in Germany, England and Russia, and sought by his writings to arouse his fellow-countrymen to greater commercial activity. He founded at Florence the Italian Geographical Society, and after its transfer to the capital was its president for five years. He was a year in Hamburg, occupied exclusively in the organization of Italian expeditions to the center of Africa and

the polar seas. He wrote of *La Storia Politica Dell' Antichità Paragonata Alla Moderna* (1866) and *I Passati Viaggi Antartici e l'Ideata Spedizione Italiana* (1880). He died in Florence, Feb. 19, 1896.

NEGRI SEMBILAN ("Nine States"), a number of small states in the interior of the Malay Peninsula, confederated in 1889 under a British officer. The confederacy comprises Sri Menanti, Rembau, Johol, Tampin and other small states, numbering, as its name implies, nine states in all and comprising about 2,000 square miles. See MALAY PENINSULA, Vol. XV, p. 322.

NEGRITO RACE. See MALAY PENINSULA, Vol. XV, p. 323; and PHILIPPINE ISLANDS, Vol. XVIII, pp. 752, 753.

NEILL, EDWARD DUFFIELD, an American educator and author; born in Philadelphia, Aug. 9, 1823; graduated at Amherst in 1842; studied theology at Andover, and occupied several important pulpits. From 1858 to 1861 he was superintendent of schools for the state of Minnesota and chancellor of the State University; from 1873 to 1884, president of Macalester College, Minneapolis. In 1884 he became professor of history and English literature in the same institution. Dr. Neill wrote several important historical works, contributed several articles to the historical magazines, and was prominent in the work done by the Minnesota Historical Society. He published *Annals of the Minnesota Historical Society* (1856); *History of Minnesota* (1858); *Terra Mariae: or, Threads of Maryland Colonial History* (1867); *The Fairfaxes of England and America* (1868); *History of the Virginia Company* (1869); *English Colonization of America during the Seventeenth Century* (1871); *Founders of Maryland* (1876); *Virginia Vetusta* (1885); *Virginia Carolorum* (1886); and *Concise History of Minnesota* (1887).

NEILL, THOMAS HEWSON, an American soldier; born in Philadelphia, April 9, 1826. He graduated at West Point in 1847, and served on the frontier in an infantry regiment. In February, 1862, he was made colonel of Pennsylvania volunteers; served in the Peninsula, and was brevetted major for gallantry at Malvern Hill. He also took part in the battles of Chancellorsville and Gettysburg; served as acting inspector-general under Sheridan, and was brevetted brigadier-general United States army, and major-general of volunteers. After the war he commanded the First United States infantry, and in 1874-75 the Sixth Cavalry. He was commandant of cadets at West Point from 1875 to 1879; served as colonel of the Eighth Cavalry, and was retired in April, 1883. He died in Philadelphia, March 12, 1885.

NEILLSVILLE, a village and the capital of Clark County, west central Wisconsin, 53 miles W. of Stevens Point, on the Chicago, St. Paul, Minneapolis and Omaha railroad; the center of a large lumbering and agricultural district; has various wood-working industries, a foundry, a machine-shop and a pump factory. Population 1890, 1,936.

NELSON, LILIAN ADELAIDE, an English actress; born of English parents in Leeds, Yorkshire, March 3, 1848. When quite young she served as barmaid in a London tavern, where, meeting many actors of the day, her inclinations not unnaturally

turned toward the stage, where she made her début in 1865 as Julia, in *The Hunchback*, being then but 15 years of age. Her impersonation revealed enthusiasm and fire, yet was evidently immature. This youthful essay was followed by an attempt at Juliet, destined to become her greatest role. There was clear promise of future excellence; yet many crudities were to be overcome. In 1870-71 Miss Neilson appeared as Amy Robsart, and for a girl of 16 her performance was highly creditable. Subsequently she essayed various characters, always showing a preference for Shakespeare, improving year by year. In 1872 a tour in the United States ended disastrously, yet on her return to England she applied herself to study with renewed zest, and during her second tour in America (1879-80), electrified her audiences by a series of brilliant impersonations, leaving her dramatic talent beyond dispute. Her Juliet was a revelation to theater habitués, her rare personal attractions, exquisite grace and sympathetic intelligence lending to the character unprecedented charm. She also revived *Twelfth Night*, enacting the rôle of Viola with thrilling success. In *Cymbeline* her triumph was scarcely less noticeable, evincing diligent and appreciative study and being strikingly adequate in delicacy of interpretation. She died in Paris, France, Aug. 15, 1880.

NEJIN, an ancient town of Russia, on the Oster, 80 miles N.E. of Kiev. It fell into the hands of the Lithuanians in 1320, and of the Poles in 1386, but was annexed to Russia in 1654. It is an industrious town, many of whose inhabitants are Greek immigrants who settled here during the reign of Catherine II. The principal branch of industry is the cultivation of tobacco. Great quantities of leaf-tobacco are sent hence to St. Petersburg, Riga and Mittau. Population, 21,203.

NELIGH, a village of Antelope County, eastern central Nebraska, 120 miles N.E. of Lincoln, on the Fremont, Elkhorn and Missouri Valley railroad. It has a flouring-mill, a saw-mill and a newspaper. Population 1890, 1,209.

NELSON, SAMUEL, an American jurist; born in New York, Nov. 10, 1792; graduated from Middlebury College, Vermont, in 1813, he entered upon the study of law. From 1823 to 1831 he was circuit judge; from 1831 to 1837 an associate justice of the supreme court of New York; and from 1837 to 1845 its chief justice. In 1845, upon the nomination of President Tyler, he became associate justice of the supreme court of the United States. In the Dred Scott case he concurred in the well-known decision handed down by Chief Justice Taney. President Grant appointed Judge Nelson to represent the United States in the Joint High Commission of Arbitration for the settlement of the Alabama claims. He died in Cooperstown, New York, Dec. 13, 1873.

NELSON, THOMAS, a signer of the Declaration of Independence; born in York County, Virginia, in 1738. Sent to Eton at 14, he later went to Cambridge University, whence he was graduated. He was a member of the provincial conventions in 1774-75, and was made colonel of a Virginia regiment, but resigned on being elected to the Continental Con-

gress. Here he signed the Declaration of Independence. During the war he made large advances from his private property for the benefit of the state, for which he never received any compensation from the government. At the siege of Yorktown he commanded the Virginia militia, and was praised for bravery by General Washington. After that he lived in retirement, his vast estate having been sold for his public debts. He died in Hanover County, Virginia, Jan. 4, 1789.

NELSON, WILLIAM, an American soldier; born in Maysville, Kentucky, in 1825; entered the United States navy in 1840, and rose to be lieutenant and master. At the beginning of the Civil War he had charge of the gunboats on the Ohio River, and in September, 1861, became brigadier-general of volunteers. He commanded a division of Buell's army, and in July, 1862, was appointed major-general of volunteers. He was shot by General Jefferson C. Davis in a Louisville hotel, and died Sept. 29, 1862.

NELSON RIVER, a river in the Canadian North-West, in the District of Keewatin. It flows from Lake Winnipeg N.E. through Split Lake to Hudson's Bay. Its length is 450 miles, but the navigation is much broken by rapids. It is known to the Indians as the Katchewan.

NELSON'S FARM, BATTLE OF. See FRAZIER'S FARM, BATTLE OF, in these Supplements.

NELSONVILLE, a village of Athens County, southeastern Ohio, on the Hocking River, and on the Columbus, Hocking Valley and Toledo railroad, 14 miles S.E. of Athens. It is principally engaged in coal mining and shipping, and is situated in the great coal-belt of Ohio. Population 1890, 4,558.

NELUMBO, the common name of *Nelumbium*, a genus of the water-lily family, with very large platter-shaped, centrally peltate floating leaves, great flowers and a top-shaped receptacle bearing a dozen or more nutlets (like small acorns) separately immersed in as many hollows. *N. luteum* is an American form with yellow flowers, and is often called water-chinquelin. *N. speciosum* is the lotus or sacred bean of India, with pinkish flowers, and is cultivated in conservatories.

NEMATHELMINTHES. See NEMATOIDEA, Vol. XVII, pp. 324-326.

NEMATOGNATHI, the order of cat-fishes. These are carnivorous fishes, inhabiting fresh waters chiefly. The name cat-fish was suggested by the barbels at the corners of the mouth. There are no scales. They have many affinities with the sturgeons. Some authors include all the cat-fishes in the family *Siluridae*, while others divide the order into several families. See SILURIDÆ, Vol. XXII, p. 68.

NEMEA, a valley in Argolis, Greece, between Cleonæ and Phlius, noted chiefly as the place where Hercules encountered the Nemean lion. This was the first of "the twelve labors of Hercules," performed at the bidding of Eurystheus. The Nemean lion was a monstrous beast, the offspring of Typhon and Echidna. After a fierce encounter, Hercules overcame the animal by strangling. In the Nemean Valley there was a temple sacred to Jupiter (Zeus), surrounded by a grove, in which the Nemean games

were celebrated every alternate year. See GREECE, Vol. X, p. 65.

NEMI, LAKE, the ancient *Lacus Nemorensis*, a beautiful lake 17 miles S.E. of Rome, situated in the crater of an extinct volcano of the Alban hills, 1,225 feet above the sea-level. It is some five miles in circumference, and on account of its placidity was called "Diana's Mirror." On the west shore is the town of Genzano. A temple of Diana, now in ruins, stood in a thick grove near the Spring of Egeria. Tradition asserts that either the Emperor Trajan or the Emperor Tiberius had a magnificent floating palace on this lake, and a beam with bronze decorations, recovered from the lake in 1535, is shown in a Roman museum as corroborative of this theory. In 1895 Prince Orsini, the owner of the lake, employed divers, who discovered in eighty feet of water a huge sunken vessel covered with mud. They succeeded in bringing up a bronze lion, a wolf of the same metal, and several other objects. See also LATIUM, Vol. XIV, p. 343.

NEMICHTHYIDÆ, a family of eels or apodal fishes, with greatly elongated body. They are rare forms from deep-sea waters. The snipe-fish (*Nemichthys*) is the best-known representative.

NEMOURS, an ancient town in the French department of Seine-et-Marne, 40 miles S.E. of Paris by rail. It gave a ducal title to the second son of Louis Philippe, born in 1814. Population, 5,000.

NEMOURS, LOUIS CHARLES PHILIPPE RAPHAEL D'ORLÉANS, DUC DE, one of the Orléans princes; was the second son of King Louis Philippe, and was born in Paris, Oct. 25, 1814. He was still a child when Charles X appointed him colonel of the First Regiment of Chasseurs de Cheval, at the head of which he made his entry into Paris, Aug. 3, 1830. In February, 1831, he was elected King of the Belgians. Subsequently he served in the two Belgian campaigns and in Algeria, being in 1837 promoted to the rank of lieutenant-general. On the premature decease of his elder brother (the Duc d'Orléans, who died July 13, 1842) he was declared regent. After the revolution of February the Duc de Nemours quitted France, and did not return until after the downfall of the empire in 1870. He married, April 27, 1840, Victorie-Auguste-Antoinette, Duchesse of Saxe-Coburg-Gotha (born Feb. 14, 1822; died Nov. 10, 1857), by whom he had two sons, Prince Louis Philippe Marie Ferdinand Gaston d'Orléans, Comte d'Eu, and Prince Ferdinand Philippe Marie d'Orléans, Duc d'Alençon, born July 12, 1844; and two daughters, the elder of whom, the Princess Marguerite Adelaide Marie d'Orléans, born Feb. 16, 1846, was married at Chantilly to Prince Ladislas, Czartoryski, Jan. 15, 1872, and died in Paris, in October, 1893. Being exiled, he resided in England, and died June 25, 1896.

NEODESHA, a city of Wilson County, southeastern Kansas, at the junction of the Fall and Verdigris rivers, 14 miles N. of Independence, on the Missouri Pacific and the St. Louis and San Francisco railroads; has a pottery, flour-mills and grain-elevators and railroad machine-shops; has coal and natural gas in the vicinity; also engaged in farming

and stock-raising. Population 1890, 1,528; 1895, 1,783.

NEO-LAMARCKISM AND NEO-DARWINISM are two terms of recent origin—the former first used in America by Professor Alpheus Spring Packard, the latter in England by the late Dr. George John Romanes—as designations of two opposing schools of evolutionists, and are accentuated uses of older terms, for the purpose of more accurately defining points of difference. The common ground of natural selection being held by both schools, their differences are indicated in the following definitions of the terms: Neo-Lamarckism is the belief of those who hold that organic evolution has been effected not solely (as expounded by Lamarck, who had not perceived natural selection) by means of the occurrence and inheritance of somatogenetic (acquired) characters, but in company with the qualifying influence of natural selection. Darwinism, as expounded by Charles Darwin himself, admits the transmission of acquired characters. Neo-Darwinism is the belief of those who claim that natural selection has been the only modifying influence in the evolution of species, and that the material for its action has been only plasmogenetic (congenital) characters. The controversy, as it has been waged between the two schools, is more or less enigmatic to all others than trained biologists; but, if we divest it of its quasi-scientific (and perhaps somewhat labored) terminology, it seems possible to state it briefly as follows: When Darwin advanced his doctrine of natural selection he both saw and confessed that it could not explain the *first origin* of anything. Selection cannot be exercised upon variations until variations have actually taken place. Consequently the *cause* of variations cannot be accounted for by laws which are only concerned in eliminating all variations of a certain sort after they have arisen. Darwin was content, for the time being, to let this problem rest as belonging to a field of causes and laws as yet unknown. Naturally, a great many evolutionists have studied over this perplexity of the law which causes (or the conditions which determine) variations, and they regard this as the one great problem of biological science. Perhaps first among them is Professor August Weismann, of Freiburg, whose new theories caused the Darwinians to divide into rival factions. In Darwin's system, natural selection could only act upon or through the individual. It could have no influence upon the species, or on future generations, except through its operation on individual organisms. It was therefore unable to account for definite lines of variation along which new forms seem to have been developed. Weismann saw the necessity for a theory which would explain these lines of variation (the origin of new species), and conceived the idea of inventing an agency, together with certain machinery whose function it is to shape these variations, which should *provide beforehand* that certain carefully selected improvements shall and must arise leading on to the establishment of higher races in the future. He

perceived that something was needed to perform the function of design, of will and foresight. This, of course, is a wide departure from the meaning of natural selection as advanced by Darwin, and as understood by most of his followers, now designated as Neo-Lamarckians. Treated as a *science*, they say natural selection was altogether mechanical, and they regard any invention of an agency which directs beforehand the paths which the variations shall follow, as quite unscientific. Weismann—we do not use his involved form of definition—says there must be certain cells in the more complex organisms which are separate and distinct from the mass of cells constituting the rest of the body, and to these separate cells he ascribes the special function of directing those variations which are to determine the future lines of development. The Neo-Lamarckians hold that there can be no warrant from actual experience in this assumption.

They admit that in every complex organism there are different cells in each different part of the common structure, and each of these different kinds of cells is clearly different, because they are to be seen discharging different functions. Those which are set apart for the functions of reproduction can be distinguished like the rest. But they hold that Weismann's original distinction in his special cells is something which he has assumed as an intellectual necessity; and that the whole reasoning rests on an abstract conception of the mind. His argument is, that there must be something permanent and immortal in organic life; otherwise we never could account for the law of heredity. For what is heredity? Simply the survival—the immortality—in the offspring of something which had lived in the parent. Those creatures (the protozoa) wholly composed of one cell, he says, are immortal. They never die. They simply divide and the separate bits live on and similarly multiply, again and again, forever. The multicellular creatures die—as to the individuals—but bits of them, too, must live on also; else there is no explanation of the hereditary succession of life. We must therefore suppose, he says, that the immortality lies in special cells differing from all the other cells which make up the mass of living bodies, and that in these special cells, called the germ-cells, all the potentialities of heredity and of generation are “provided for.” Weismann realized that in order to defend the position of his germ-cells he must deny that they can be at all accessible to outward influences. They must exist, as it were, in a sphere of unapproachable and divine independence. To suppose them capable of being changed or altered in any way, by accidents of circumstance, would be to impair their dignity and cast a doubt upon the certainty of their work. That work must be determined by purely internal and innate powers and gifts. These cells, therefore, must not be thought of as taking any part in the mere superficial changes which go along with the changes of outward life; for these outward superficial changes are what constitute adaptation and furnish one of

the chief elements in the Neo-Lamarckian theory of evolution. The Neo-Lamarckians believe, as did Darwin, that the main factor in the progress of evolution and the origin of species rests and depends upon the seizing and holding, by each organism, of the new characters which are acquired from time to time; that these characters are molded by the action and reaction of the external world, and are transmitted from parent to offspring by ordinary generation.

Weismann cuts himself sharply asunder from this idea, which was not only held by Darwin but by Lamarck before him. He declares it to be utter fallacy. His newly imagined germ-cells must be wrapped about with a mantle of holiness. They are the sole determinants in hereditary transmission; environment must never affect them; nothing must interfere with their sublime functions. He is willing to retain Darwin's formula of natural selection, but it is only for occasional or special uses. These most potent germ-cells, he says, were never *acquired* by the parent nor ever transmitted, in the real sense, by the parent to the offspring. All characters in the offspring are due to "primary" changes in the germ. They were "provided beforehand." If, therefore, the Neo-Darwinian should deride the Lamarckian doctrine that the woodpecker's bill is lengthened through use and inheritance, he may, not unlikely, be asked whence came the sanction for Weismann's belief in these stupendous potentialities which determine even the minutest variability in all species and types through all eternity, and which came:—

"Into this universe, and Why not knowing,
Nor Whence, like water willy-nilly flowing."

Mr. Herbert Spencer, *facile princeps* among the exponents of Darwinism—or Neo-Lamarckian—evolution, holds views strongly opposed to those of Weismann; and it seems reasonable to believe—if for no other reason than that the *onus probandi* rests with the newer school—that Spencer has the best of the argument. The Neo-Lamarckian view has long had possession of the field, and the Neo-Darwinian ideas of Weismann seem composed of assumptions which cannot be verified. The author of the new cult must prove his case; it is not incumbent upon the older school to disprove. That variations in organic forms do take place, and *apparently* through the influence of external conditions; and that new characters, seen for the first time in a parent, are seemingly inherited by his offspring, there has been (the Lamarckians hold) no consistent effort to disprove. Weismann's only chance to demonstrate the falsity of this claim is, they say, only through his assumptions and hypothetical machinery.

But, it may be asked, what is the secret of the huge importance of this question?

It is that an idea has grown (seemingly through a misconception, or, at least, an inadequate realization of the actual differences), that the older Darwinian view excludes the possibility of teleological explanations, and that the new theory of Weismann admits of them. Weismann dwells on

the "purposefulness seen in organisms," and declares that natural selection, as invented by Darwin, is helpless toward explaining the origin of anything. The Darwinians admit the latter implication without questioning; but reply that when Professor Weismann succeeds in giving a thoroughly intelligible account of the *machinery* through which he explains the origin of things, he will have earned not merely their attention, but that of an entire waiting world. As for the teleological possibilities surrounding the doctrines of either school, it is fair to say that the idea of design, as an agency in creation, is no farther away from the older Darwinian than it is from the Weismann view. Not only do the adherents to the older school disclaim pure materialism as a necessary consequence of their system, but, throughout the writings of Mr. Herbert Spencer, he has never failed to breathe a spirit of real reverence for the "Unknowable," the recognized power which lies underneath and behind all observable phenomena. Biology, as a science, does not deal with mental agencies; but, as between the teleological implications of one or the other school, no mind which is both unprejudiced and well informed will be likely to see less of grandeur in the idea of an Unknowable Power which is evolving order out of confusion by working in and through the external conditions which produce variations, than in the accomplishment of a similar result through the media of primordial determinant germ-cells "provided beforehand."

For a fuller treatment of the Weismann theory, see HEREDITY, in these Supplements.

J. F. CARGILL.

NEOSHO, a city and the capital of Newton County, southwestern Missouri, 22 miles S. of Carthage, on the Kansas City, Pittsburg and Gulf and the St. Louis and San Francisco railroads; has an extensive canning factory, plow and wagon factory, foundries, flour and woolen mills. The place is frequented on account of its well-known mineral springs. It has a fish-hatchery, established by the government. Population 1890, 2,198.

NEOSHO RIVER, rises in Morris County, in the eastern central part of Kansas, runs south into Allen County, thence southeast into the Indian Territory, and joins the Arkansas near Fort Gibson. It is 450 miles in length. Its chief tributary is the Cottonwood.

NEPENTHES. See INSECTIVOROUS PLANTS, Vol. XIII, pp. 134, 138, 139.

NEPHELINE. See MINERALOGY, Vol. XVI, p. 412.

NEPHI, a city and the capital of Juab County, central Utah, 90 miles S. of Salt Lake City, on the Union Pacific and the San Pete railroads. It is in a sheep-raising district, and has numerous salt-wells. Gypsum, salt and marble are shipped. Population 1880, 1,797; 1890, 2,034.

NEPHOSCOPE, an instrument for observing the motions of clouds. It is commonly made with a circle, marked off into degrees, within

which is a mirror. An arrangement of wires or rods is provided, so that the mirror can be viewed from a set point. In use, the circle is set with the zero point directed toward one of the cardinal points of the compass, and the cloud being viewed through a fixed point in the wires, the direction of motion is noted readily. If there are concentric circles on the mirror, the angular velocity of the cloud may be calculated; and if there are means of judging of the height of the cloud, its linear velocity may also be determined.

NEPHRIDIA. See MOLLUSCA, Vol. XVI, pp. 633, et seq.

NEPHRITE OR JADE. See MINERALOGY, Vol. XVI, p. 417.

NEPIGON OR NIPIGON LAKE, an irregularly shaped body of water, in Thunder Bay district, western Ontario, Canada, about fifty miles N. of Lake Superior, into which it has an outlet by way of the Nepigon River. It has a length north and south of about seventy miles and a width east and west of 50 miles; is 313 feet above the level of Lake Superior, and has a depth in some places of 500 feet. The lake contains many islands, has hilly, deeply indented shores, giving a coast-line of 580 miles, and is much resorted to for summer hunting and fishing. The surrounding country, though but sparsely settled, is suited for agriculture.

NEPOMUK OR POMUK. See JOHN OF NEPOMUK, Vol. XIII, p. 718.

NEPTHYS, an Egyptian divinity. See EGYPT, Vol. VII, pp. 716, 717.

NEPTUNE. See ASTRONOMY, Vol. II, p. 813.

NEREIDS, daughters of NEREUS, q.v., Vol. XVII, p. 346.

NERITIDÆ, a family of gasteropod mollusks, mostly marine. All have thick, globular shells, *Nerita* and *Neritina* are the best-known members of the family. There are over two hundred species in the family.

NERUDA, JAN, a Bohemian poet; born in Prague, in 1834. He was one of the founders of Czech literature, and published *Knihy Versu* (Book of Verses, 1868), etc. He died Aug. 24, 1891. See SLAVS, Vol. XXII, p. 152.

NERVES, PHYSIOLOGY OF. See EMBRYOLOGY, in these Supplements.

NERVOUS SYSTEM. See ANATOMY, Vol. I, pp. 852-883. DISEASES OF, see PATHOLOGY, Vol. XVIII, pp. 390-399.

NESS, LOCH. See SCOTLAND, Vol. XXI, p. 526.

NESTS OF BIRDS. See *Nidification*, under BIRDS, Vol. III, pp. 771, 772.

NETHERLANDS. For general article on the Netherlands, see HOLLAND, Vol. XII, pp. 59-98. The territory of the Netherlands is divided into eleven provinces and 1,123 communes, each province having its own provincial representative body. The members are elected for six years.

The following table gives the areas and the populations of the 11 different provinces of the kingdom, as reported by the census of Dec. 31, 1894:

PROVINCES.	AREA, ENGLISH SQ. MILES.	POPULATION Dec. 31, 1894
North Brabant-----	1,980	528,718
Guelders-----	1,965	534,737
South Holland-----	1,166	1,021,865
North Holland-----	1,070	906,136
Zealand-----	690	207,228
Utrecht-----	534	235,378
Friesland-----	1,282	337,765
Overijssel-----	1,291	310,299
Groningen-----	790	285,780
Drenthe-----	1,030	139,148
Limburg-----	850	268,592
Total-----	12,648	4,795,646

Of the total population in 1894 there were 2,372,406 males and 2,423,240 females.

The constitution of 1815 was revised in 1848, and finally completed in 1887. Under this revised constitution the "Netherlands form a constitutional and hereditary monarchy." The royal succession is in the direct male line in the order of primogeniture; in default of male heirs, the female line ascends to the throne. In default of a legal heir, the successor to the throne is designated by the King with the concurrence of both Houses of Parliament (each containing twice the usual number of members), and by this assembly alone if the case occurs after the king's death. The age of majority of the ruler is 18 years. During a minority the royal power is vested in a regent—designated by law—or in some cases in the state council.

The present royal family of the Netherlands is known as belonging to the House of Orange. This family is descended from a German count, Walram, who lived in the eleventh century. (See NASSAU, Vol. XVII, p. 239.) Through the marriage of Count Engelbrecht, of the branch of Otto, Count of Nassau, with Jane of Polanen, in 1404, the family acquired the barony of Breda and thereby became settled in the Netherlands.

The later years of William III were marred by much illness, causing at times serious apprehension as to his ability to continue his administration as sovereign, and Queen Emma was authorized to act as regent. She accepted the regency and took the oath of office Nov. 20, 1890. King William III died Nov. 23, 1890, and Wilhelmina Helena Pauline Maria, born Aug. 31, 1880, daughter of his second wife, Queen Emma, then succeeded to the throne.

King William II had a civil list of \$400,000, but the amount was reduced to \$240,000 at the commencement of the reign of King William III. There is also a large revenue from domains, and in addition an allowance of \$20,000 for the maintenance of the royal palaces. The heir-apparent has \$40,000, which sum is doubled in case of a marriage with the consent of the states-general. The queen-widow receives an annual allowance of \$60,000. The family of Orange is, besides, in the possession of a very large private fortune, acquired in greater part by King William I, in the

prosecution of vast enterprises tending to increase the commerce of the Netherlands.

The executive power of the state belongs exclusively to the sovereign, while the whole legislative authority rests conjointly in the king and parliament, the latter—called the states-general—consisting of two chambers. The upper or first chamber is composed of fifty members, elected by the provincial states from among the most highly assessed inhabitants of the eleven provinces, or from among some high and important functionaries, mentioned by bill. The second chamber of the states-general numbers 190 deputies, and is elected directly from among all the male citizens who are thirty years of age and are not deprived by judicial sentence of their eligibility or the administration and the disposal of their property. Voters are all male citizens, 23 years of age, who have paid either a ground-tax of at least 10 guilders, or a direct tax (personal) to an amount higher than the sum which gives partial exemption from taxation, and which varies according to population, or who are lodgers according to the precepts of the law. The total number of electors, according to the new constitution, is 290,000, which gives one voter in about 15 persons. The members of the second chamber receive an annual allowance of \$800, besides traveling expenses. They hold their office for four years and retire in a body, whereas the first chamber is elected for nine years, and every three years one third retire by rotation. The queen has the power to dissolve both chambers of Parliament, or one of them, being bound only to order new elections within forty days and to convoke the new meeting within two months.

Only the government and the second chamber have the right of introducing new bills, the functions of the upper chamber being restricted to approving or rejecting them, without the right of inserting amendments. The meetings of both chambers are public, though each of them, by the decision of the majority, may form itself into a private committee. The ministers can attend at the meetings of both chambers, but they have only a deliberative voice, unless they are members. Alterations in the constitution can be made only by a bill declaring that there is reason for introducing those alterations, followed by a dissolution of the chambers and a second confirmation by the new states-general by two thirds of the votes. Unless it is declared explicitly, the laws concern only the realm in Europe, and not the colonies.

The executive authority belongs to the sovereign, acting with a cabinet council of six ministers. Each minister receives an annual salary of about \$5,000.

There is a "state council" (Raad van State), appointed by the sovereign, of which council she is president. This council is consulted on all legislative and many executive matters.

On Dec. 31, 1894, the towns of more than 20,000 inhabitants each reported populations as follows:

POPULATION.		POPULATION.	
Amsterdam (capital)-----	450,189	Nimeguen-----	35,795
Rotterdam-----	234,916	Dordrecht-----	35,552
The Hague-----		Leeuwarde-----	31,357
(sGravenhage) -	180,454	Delft-----	31,529
Utrecht-----	92,581	Nieuwer-Amstel--	31,969
Groningen-----	59,679	Bois-le-Duc-----	
Haarlem-----	58,390	(sHertogenbosch)	28,826
Arnhem-----	53,239	Zwolle-----	28,944
Leiden-----	44,734	Schiedam-----	25,983
Tilburg-----	36,275	Breda-----	24,397
Maestricht-----	33,261	Deventer-----	24,475
		Helder-----	25,254

The government budget for 1895 estimated the revenues at \$51,324,748 and the expenses at \$54,557,444. The estimated figures for 1896 being, for the former, \$52,343,346; for the latter, \$53,345,064.

The national debt of the Netherlands in 1894 was \$446,448,097.

The southern and eastern frontiers are defended by few fortresses. The most effective means of defending the Netherlands consists in piercing the dykes and inundating a great stretch of land between the sea and the river, the Lek. The few roads lying above the level of the water are guarded by fortresses connected with each other; the river can be defended by gun-vessels if necessary. A large part of the province of Utrecht, besides North and South Holland, with the principal towns, is thus secured.

The army of the Netherlands, which was reorganized nearly on the system of Germany in 1881, is formed partly by conscription and partly by enlistment, the volunteers forming the stock, but not the majority of the troops.

The regular army on footing of war consisted, in 1895, of 46,039 infantry, 3,132 cavalry, 1,632 engineers, 16,080 artillery; in all, about 68,000 men, including officers and special services.

In peace the total number of the army is only 20,222 men and 1,766 officers.

Included in the infantry are 1 regiment of guards and 8 regiments of the line; there are 3 regiments of cavalry, 1 battalion of sappers and miners, 3 regiments of field artillery, 4 of fortress artillery, 1 corps of light-horse artillery, 1 corps of pontooneers, and 1 corps of torpedoists.

	SQ. MILES.	POPULATION.
Java and Madura-----	50,554	24,642,935
Sumatra, west coast-----	31,649	1,274,898
Sumatra, east coast-----	35,312	304,602
Benkulen-----	9,399	159,431
Lampongs-----	11,284	131,809
Palembang-----	53,497	597,596
Atjeh-----	20,471	529,562
Riau-Lingga Archipelago-----	16,301	104,756
Banca-----	4,446	84,998
Billiton-----	1,863	40,184
Borneo, west coast-----	58,825	418,000
Borneo, south and east districts--	156,912	870,000
Island of Celebes-----	49,390	1,450,100
Island of Menado-----	22,080	394,500
Molucca Islands-----	43,864	376,000
Timor Archipelago-----	17,698	37,500
Bali and Lombok-----	4,060	1,360,000
New Guinea to 141° E. longitude--	151,789	200,000
Total-----	736,400	32,800,000

The colonial possessions of the Netherlands in the East and West Indies on Jan. 1, 1895, were estimated to embrace an area of 766,137 square miles, with an aggregate population, according to the latest returns, of 33,000,000, or more than seven times as large as that of the mother country. The subjoined table formulates the estimated summaries for the several Dutch possessions in the East Indies (some still unexplored not being included):

For history and geography, see HOLLAND, Vol. XII, pp. 59-98

NETTEMENT, ALFRED FRANÇOIS, a French journalist and author; born in Paris, July 22, 1805; educated at the College Rollin; and afterward contributed criticisms to *L'Universel*. He was an ardent legitimist, and after the revolution of 1848 founded *L'Opinion Publique*, which advocated the restoration of Louis Philippe; but this publication was suppressed in 1851, and the editor imprisoned. He afterward resumed his journalistic career, while he also devoted great study to historical subjects. A list of his works includes *Histoire de la Révolution de Juillet 1830* (1833); *Suger et son Temps* (1842); *Vie de Marie-Thérèse de France* (1843-72); *Études Critiques sur le Feuilletion Roman*, criticisms from the French press (1845); *Études Critiques sur les Girondins* (1848); *La Révolution Française* (1848); *Histoire de la Littérature Française sous la Restauration* (1852); *Histoire de la Littérature Française sous la Royauté de Juillet* (1854-58); *Vie de Madame la Marquise de la Rochejacquin* (1858-65); *Souvenirs de la Restauration* (1858); *La Conquête d'Alger* (1856); *Histoire de la Restauration* (1860-72). He died in Paris, Nov. 15, 1869.

NETTLEWORTS, the nettle family. See NETTLE, Vol. XVII, p. 360.

NEUENDORFF, ADOLPH, a German-American composer and conductor; born in Hamburg, June 13, 1843; and exhibited musical talents at an early age. His parents went to the United States in 1855; the son, continuing his studies in New York City, became chorus-master of the German theater in 1857. Two years later he traveled in South America as a pianist, accompanied by his father; and in 1863 became conductor in the German theater at Milwaukee, and later returned to New York as a conductor. There he was with the Philharmonic Society (1878). His compositions were received favorably.

NEUKOMM, SIGISMUND, a German composer; born in Salzburg, in 1778. From 1804 till 1820 he taught music in St. Petersburg, Vienna, Paris and Rio de Janeiro. In 1821 he returned to Paris, living at the house of Prince Talleyrand, and went with him to England in 1830. He produced about eight hundred compositions, composing operas, cantatas, symphonies, songs, etc. *Mount Sinai* (1831) and *David* (1834) are his most noted works. Toward the end of his life Neukomm became blind. He died in Paris, in 1858.

NEURINE. See NITROGEN, Vol. XVII, p. 520.

NEURITIS, an inflammation of the nerves. Nerve-fibers consist of a fibrous cylindrical

sheath, within which is a semi-fluid substance, the medullary substance, surrounding an axis-cylinder, the nerve proper. When the fibrous sheath is inflamed it is congested and swollen, and presses more or less upon the contained tissues. When the medullary substance is inflamed it loses its homogeneous structure and divides into segments, globules or granules. When the axis-cylinder is inflamed its continuity is broken, it becomes granular, and finally disappears. A possible result of neuritis is the complete replacement of nerve-fibers by fibrous tissue. Inflammation of the nerve-cells and nerve-centers is more serious in its character, resulting in degeneration and destruction of nerve-tissue, loss of function, etc. The symptoms of neuritis are more or less fever, pain, with impairment of sensation, and localized paralysis, according as sensory or motor nerves are affected. The causes of neuritis may be exposure to cold, wounds or bruises, the extension of disease from adjacent parts, etc. The bacilli of diphtheria, scarlet-fever, typhoid-fever and other zymotic diseases may set up the inflammation, as may also certain poisons, as alcohol, the salts of lead, mercury, etc. The treatment is indicated by the causes, which are safely determined only by the physician.

NEUROPTERA, an order of insects of uncertain limits. In the order many authors include a large heterogeneous assemblage of insects with gauzy wings, having numerous longitudinal and cross veins. Some authors restrict the order to the hellgrammites, ant-lions and related genera. See INSECTS, Vol. XIII, pp. 148-151.

NEUROSES. See SKIN DISEASES, Vol. XXII, p. 123.

NEUSIEDLER SEE, a lake of HUNGARY, Vol. XII, p. 362.

NEUTRALITY. See DECLARATION OF PARIS, Vol. VII, p. 21; also INTERNATIONAL LAW, Vol. XIII, pp. 195, 196.

NEUVILLE, ALPHONSE MARIE DE, a French artist, the most popular of the later school of French painters of battle-scenes; born in St. Omer, May 31, 1836. After studying under Delacroix, he painted a series of successful pictures illustrative of French exploits in the Crimean War, Italy and Mexico. Then came the war with Germany. Neuville fought in the ranks and learned something of real warfare from actual experience. This knowledge imparted additional power to his next and last series of works, depicting incidents of that war. The attack at Rorke's Drift and that at Tel-el-Kebir were also chosen by him as subjects for pictures. Neuville excelled, moreover, as an illustrator of books, his best work in this line being the designs for Guizot's *Histoire de France*. He died in Paris, May 20, 1885.

NEVADA had a population in 1890 of 45,761; that of 1880 was 62,266, the loss of 16,505 constituting a decrease of 26.51 per cent. No other state in the Union showed a decrease in population in 1890, and not one made such an exhibit in

1880. The rank in population in the year last named was 43; in 1890 Nevada had fallen to 49, or last among all the states and territories. Almost the entire loss of inhabitants fell upon the rural portions of the state, their decrease in population being 13,085. The one city to have a population of 8,000 or more in 1890 contained 18.60 per cent. of the entire number of inhabitants of the state, of whom 29,214 were males and 16,547 were females. The last census showed 242 negroes, a loss of 246 since 1880; there were



STATE SEAL OF NEVADA.

2,833 Chinese; the civilized Indians numbered 3,599 and the Japanese three. The native-born population constituted 67.86 per cent. of the whole, and the density of population was 0.42 to the square mile, a decrease from 0.57 in 1880.

Nevada has a large amount of arable land that, with the aid of irrigation, produces excellent crops, but up to 1896 the development of the state had not been such as to make a showing of the resources of the agricultural portions. Much of the land on the mountain-slopes and in the valleys furnishes, without irrigation, pasturage that is not excelled in the Pacific coast region. The census reports of 1890 show 15,530 acres devoted to the cereals, more than one half of which was cultivated in barley. Of this grain there was produced 237,192 bushels, giving Nevada the rank of 20 among the states as a producer of barley. Oats came next in the quantity raised, the amount being approximately 100,000 bushels; wheat ranking next, with a little in excess of 81,000 bushels. In 1889 there were 1,277 farms, and although this was a decrease in the number as compared with 1879, the number of acres of improved land was more than doubled, being 733,052. The total valuation of lands, fences, buildings, farm implements and machinery, and live-stock was \$18,678,710, an increase of more than 100 per cent. during the decade immediately preceding. The number of horses was 56,788; the number of neat cattle, 210,900, including 9,273 milch cows; the number of swine, 7,373; and the number of sheep, 273,469, from which 1,450,868 pounds of wool was shorn. The meadow-land reported aggregated 140,199 acres, an increase over 1880 of almost 100 per cent.

Nevada has been a mineral-producing state from its earliest history. The census reports of 1890 give the total value of all mineral products of the state for the preceding year as \$10,143,874. While gold is not abundant as a metal, some of the argentiferous ores contain a large amount in combination. The percentage varies from 20 per cent in some ores to 50 per cent in others. Silver is the staple mineral product of the state. The

number of ounces produced in 1889 was 4,696,605, of the value of \$6,072,241. The gold product for the same year amounted to 169,617 fine ounces, of the value of \$3,506,295. The total yield of gold and silver of the state for 1892 was \$3,492,416, but in 1893 the aggregate value was almost one million dollars less. Estimates of the amount of these two metals produced from the commencement of mining operations place the value at \$587,381,515. The depression affecting business affairs in 1893 seriously interfered with the working of the mines, and only such as were thoroughly opened up and in working order were enabled to run at a profit; and the three years next succeeding were very similar. Iron-ore of an almost pure quality has been found, which has been shipped to San Francisco for manufacture into steel since 1894. By reason of its purity and the ease with which it can be mined and shipped, this deposit gives great profit to the miners and shippers and has added a new source of wealth to the state. In the western portion, bituminous coal of excellent quality was discovered in 1894, and is so located as to be easily shipped to consuming points throughout the western part of Nevada and eastern California. Large fields of borax deposits exist in Washoe County, about one hundred miles north of Reno. The borax is in an almost pure state, and operations to place it on the market in commercial form were commenced in 1894. The state is rich in mineral springs. One near Carson City has a flow of 4,000 gallons an hour, with the temperature 120° F. The mineral constituents are soda, borax, iron, magnesia and arsenic. In different sections there are 70 alkali springs, 15 mineral springs, 8 thermal, 22 warm, besides numerous springs impregnated with soda, sulphur and other mineral substances.

In 1890 Nevada had 95 specified manufacturing industries, in which capital to the amount of \$1,211,269 was invested; 620 persons were employed, to whom \$445,503 were paid as wages; and products of the value of \$1,105,063 were turned out. The leading lines of industry were car and general shop construction (\$435,084), chemicals (\$208,300), and printing and publishing newspapers and periodicals (\$106,497). No factories were reported from four counties of the state, the remaining ten counties all having one or more industrial establishments.

At the beginning of 1895 the state had a debt of \$157,628, for the extinction of which there was an almost equal amount in the treasury. The school fund holds a bond of the state for \$380,000, bearing five per cent annual interest. This bond is irredeemable, and cannot be properly classed as a state debt. The disbursements for 1894 were \$522,174; the amount remaining in the treasury Jan. 1, 1895, was \$315,846. The expenses of the years 1893-94 were \$505,386, the revenues raised to meet the same amounting in the time to \$490,872. Of the money on hand, there was \$78,645 belonging to the school fund and about \$20,000 in the different university funds. The assessment upon which the revenues mentioned were raised

showed the value of the real estate to be \$18,029,819; personal, \$8,148,241: making a total of \$26,178,060. The assessed valuation has never exceeded one third of the actual valuation, which would place the aggregate wealth of the state at nearly \$80,000,000, a sum almost \$100,000,000 less than the estimate given by the census bureau of Washington, District of Columbia, previous to the financial depreciation that came to the country generally in 1893.



STATE CAPITOL, CARSON CITY.

The school population of 1895 was near 10,000, of whom over 7,000 were enrolled, and more than 66 per cent of the enrollment attended the 300 schools of the state. The leading institution of higher education in Nevada is the State University (q.v., in these Supplements). This institution was partially destroyed by fire in November, 1895, but was soon rebuilt. The total state expenditures for the public schools and the State University for the biennial period ending with the beginning of 1895 amounted to \$249,815. The amount of bonds with accrued interest and cash held by the state in trust for the educational funds was, in 1895, \$1,290,999. In addition, over 400,000 acres of land belonging to the common-school fund of the state remained unsold.

The state penal, charitable and reformatory institutions include the following: State prison, average number of inmates during 1895 88, cost of maintenance for the year \$62,994; the state insane asylum, average number of patients 187, cost of maintenance for the year \$70,908; state orphans' home, average number of children in attendance 80, expenses of maintenance for the year \$27,975. The deaf, dumb and blind are maintained at the California institution for these unfortunates, the cost to the state of Nevada being \$300 annually for each person.

The National Guard of Nevada consisted, from 1893 to 1896, of seven companies of infantry and a

battery of light artillery attached to infantry. This force included 47 officers and 438 enlisted men, the seven companies being all embraced in one regiment. The appropriation for the annual maintenance of the Guard in 1895 was about \$6,300, supplemented by a Federal appropriation which amounted to \$2,500.

There were 920 miles of railway lines in Nevada in 1895, the Central Pacific alone constituting about one half of this mileage. The total valuation of the different lines was given at \$8,825,000, the estimated cost of building, however, having been fully double this amount.

Nevada had in 1890, 64 church organizations, 41 edifices, a membership of 5,877, which constituted 12.84 per cent of the population. Nine denominations were represented in the census, of which the most prominent in point of numbers were the Adventists, 4 bodies; Roman Catholics, 20; Latter-Day Saints, 20; all Methodists, 12; all Presbyterians, 8; and Protestant Episcopalians, 9.

Jan. 1, 1896, there were 26 papers of all kinds published in Nevada. Of the 14 counties of the state, there were one or more papers published in 13. In 17 of the cities, towns and villages and in 12 of the county seats, 9 of the papers were daily, 2 semiweekly and 15 weekly.

The following is a list of the principal cities and towns of Nevada, with the population as given in the census reports of 1890: Virginia City, 8,511; Carson City, 3,950; Reno, 3,563; Eureka, 1,609; Austin, 1,215; Tuscarora, 1,156; and Winnemucca, 1,037.

The following is a list of the governors of Nevada from 1864, the date of the admission of the state into the Union, with their terms of office: James W. Nye, 1864; Henry G. Blasdel, 1864-71; Luther R. Bradley, 1871-79; John H. Kinkadee, 1879-83; Jewett W. Adams, 1883-87; Christopher C. Stevenson, 1887-90; Frank Bell, 1890-91; Roswell K. Colcord, 1891-95; John E. Jones, 1895-96; Reinhold Sadler, 1896-. See NEVADA, Vol. XVII, pp. 367, 368.

NEVADA, a town and the capital of Storey County, central Iowa, 28 miles W. of Marshalltown, on the Chicago and Northwestern railroad; has tile factories and flour-mills, also two grain-elevators, a foundry and machine-shop, a planing-mill and a wagon factory. The State Agricultural College is nine miles west of the town. Population 1890, 1,662; 1895, 2,107.

NEVADA, a city and the capital of Vernon County, southeastern Missouri, 87 miles S. of Kansas City and 39 miles S.W. of Osceola, on the Missouri, Kansas and Texas and the Missouri Pacific railroads, the seat of Christian University (Campbellite), of Cottery College (non-sectarian), and of the State Insane Asylum, No. 3. It has a very fine park and public library, galvanized-iron and carriage works, and flour and lumber mills, and is surrounded by a rich agricultural and stock-raising country. Coal is mined in the vicinity. Population 1890, 7,262.

NEVADA CITY, a city and the capital of Nevada County, north central California, 128

miles N.E. of San Francisco, on the Southern Pacific railroad; has rich gold mines in the vicinity, and is a center of supply for the neighboring mining towns, and for an agricultural, grape and fruit district. Population 1890, 2,524.

NÉVÉ. See GLACIER, Vol. X, 627, 628.

NEW ALBANY, a city of Indiana. The principal railroads entering the city are the Baltimore and Ohio Southwest, the Louisville, Nashville, Albany and Chicago, the Louisville, Evansville and St. Louis, and the Pittsburg, Cincinnati, Chicago and St. Louis. The city has a new belt line of street electric railways extending through the different suburbs, and has De Pauw University (q.v., in these Supplements). Population 1890, 21,059. See NEW ALBANY, Vol. XVII, p. 369.

NEWARK, a village of New Castle County, northwestern Delaware, 11 miles S.W. of Wilmington, on the Baltimore and Ohio railroad. Delaware College (non-sectarian) was founded here in 1870, and in 1896 had 14 instructors, 78 students, and a library containing 6,736 volumes. Newark has a foundry, a paper-mill, a woolen-mill and two carriage-shops. Population 1890, 1,191.

NEWARK, the capital of Essex County, northeastern New Jersey. The principal railroads entering the city are the Pennsylvania, the Delaware, Lackawanna and Western, the Erie and the Central of New Jersey. There are 63 miles of paved streets and over twenty miles of trolley lines. Great improvements have been made of recent years for the navigation of the Passaic river. The United States census for 1890 gives the following statistics of manufactures for Newark: Number of industries, 2,490; capital invested, \$62,552,752; wages paid annually, \$26,857,170; total value of products, \$93,476,652; average number of employees, 46,848. Newark has nine national banks, one state bank with a capital of \$100,000, and five savings banks. Two life-insurance companies, the Mutual Benefit and Prudential of America, have their central offices here. There are upward of one hundred churches, embracing almost every denomination, the Presbyterians heading the list with 23 and followed closely by the Methodists with 22. Charitable and benevolent institutions are quite numerous; principal among them are an insane asylum, four hospitals, an eye-and-ear infirmary, the Female Charitable Society, the Foster Home for Children, the orphan asylum, and the City Home for the reform of juvenile delinquents. Chief among the new public buildings which have been erected in recent years is the Prudential Life Insurance Company building, situated at the corner of Broad and Bank streets, a thirteen-story structure constructed of gray stone, fire-proof, and equipped with the latest devices for convenience. The new public library is also a fine structure. Population 1890, 181,830; 1895, 215,806. See also NEWARK, Vol. XVII, p. 370.

NEWARK, a village of Wayne County, north central New York, 5 miles W. of Lyons and 29 miles E.S.E. of Rochester, on the New York Cen-

tral and Hudson River railroad; situated in an agricultural region; has a state custodial asylum for feeble-minded women, and a union school library, founded in 1857. The inhabitants are engaged principally in peppermint-distilling, fruit evaporating and canning, and the manufacture of tinware, vinegar and flour. Population 1890, 3,698.

NEWARK, a city and the capital of Licking County, central Ohio, on the Baltimore and Ohio and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. The car-shops of the Baltimore and Ohio railroad are situated here. Population 1890, 14,270. See NEWARK, Vol. XVII, p. 371.

NEWAYGO, a village and the capital of Newaygo County, western lower Michigan, 30 miles N.N.W. of Grand Rapids, on the Chicago and West Michigan railroad; has extensive water-power, and manufactories of furniture, lumber, pails and bricks. Population 1890, 1,330; 1894, 1,231.

NEW BEDFORD, a city and one of the capitals of Bristol County, in the state of Massachusetts, on the Old Colony and the New York, New Haven and Hartford railroads; has steamers to Cottage City, distance 32 miles, and freight steamers to New York; electric street-railways to Fall River and Fairhaven; stages to Dartmouth, 7 miles, to Little Compton, Rhode Island, 20 miles; to Mattapoisett, 6 miles; to Marion, 12 miles; and to Westport Point, 16 miles. In 1896 in the manufacture of cotton goods it stood second in the United States; the largest cotton manufactory in the world, called the Wamsutta mills, is here. The number of employees in the 31 cotton factories is 12,000. New Bedford also manufactures soap, cordage, carriages, leather and glass. The public library has 75,000 volumes. Population 1890, 40,733; 1895, 55,251. See NEW BEDFORD, Vol. XVII, p. 371.

NEWBERG, a postoffice of Yamhill County, northwest Oregon, 20 miles S.W. of Portland; known only as having Pacific College (Friends), a co-educational institution organized in 1890, and had in 1896 8 instructors, 150 pupils and a library containing 500 volumes.

NEW BERLIN, a station in Berks County, central Pennsylvania, nine miles N. of Pottstown; the seat of Central Pennsylvania College (Evangelical), a co-educational institution founded in 1855, which had in 1896 8 instructors, 79 pupils and a library containing 4,217 volumes.

NEWBERN, a city and the capital of Craven County, North Carolina. Population 1890, 7,843. See NEW BERNE, Vol. XVII, p. 372.

NEWBERRY, a village and the capital of Newberry County, northwestern South Carolina, 47 miles W.N.W. of Columbia, on the Columbia, Newberry and Laurens railroad. The seat of Newberry College (Lutheran), organized in 1857, which had in 1896 8 instructors, 85 pupils, and a library containing 6,500 volumes. Good granite is found in the vicinity. It is an important market for cotton. Population 1890, 4,865.

NEWBERRY, JOHN STRONG, an American

geologist; born in Windsor, Connecticut, Dec. 22, 1822. After studying medicine at the Cleveland



PROF. J. S. NEWBERRY.

Medical College and traveling in Europe, he settled as a physician in Cleveland, Ohio, in 1851, where he remained till 1855. In the latter year he joined an expedition for exploring the country between San Francisco and the Columbia River. He was also with Lieutenant Ives, in 1857, in the exploration and navigation of the Colorado River, spending nearly a year in exploring the Grand Cañon. The summer of 1859 he spent in traveling over southern Colorado, Utah, northern Arizona and New Mexico, studying a large area of country that was before unknown. In 1861 Dr. Newberry became a member of the United States sanitary commission. He had charge of all the work of this commission in the Mississippi Valley. After the war he was made professor of geology at the Columbia School of Mines, and in 1869 he was appointed state geologist of Ohio. In 1884 he was made palæontologist of the United States geological survey. As a geologist and a palæontologist he occupied one of the foremost places. His works include *The Rock Oils of Ohio* (1859); *The Botany, Geology and Zoology of Northern California and Oregon*; *The Geology of the Colorado Expedition* (1860); *The Colorado River of the West Explored* (1861); *The United States Sanitary Commission in the Valley of the Mississippi* (1866); *Geological Survey of Ohio*; *Our Later Extinct Floras* (1869); *Circles of Deposition in American Sedimentary Rocks* (1873); *Iron Resources of the United States* (1874); *Geology of the San Juan Expedition* (1875); *The Structure and Relations of Dinichthys* (1875); *Fossil Fishes and Fossil Plants of the Triassic Rocks of New Jersey and the Connecticut Valley* (1888); *Palæozoic Fishes of North America* (1889). He died in New Haven, Connecticut, Dec. 7, 1892.

NEWBERRY, WALTER LOOMIS, an American philanthropist; born in East Windsor, Connecticut, Sept. 18, 1804. In 1833 he removed to Chicago, where he was very successful as a merchant and banker. By his will he left over \$2,000,000 to found the library in Chicago known by his name. The building, facing Washington Common, is one of the architectural features of the city. The library is the best reference library in the West, some of its departments containing rare collections, as, for example, its recently acquired Chinese collection. He died Nov. 6, 1868.

NEW BLOOMFIELD, a borough and the capital of Perry County, southeastern Pennsylvania, 20 miles N.W. of Harrisburg, on the Perry County railroad; has an academy, a foundry and a tannery. The scenery in the vicinity is very beautiful. Population 1890, 655.

NEW BRAUNFELS, a village and the capital of Comal County, Texas, 41 miles S.S.W. of Austin, on the International and Great Northern railroad; has an academy, a woolen-mill and an oil-mill. Population 1890, 1,608.

NEW BRIGHTON, a village of Richmond County, eastern New York, on the N.E. shore of Staten Island, 6 miles S.W. of New York City. It is on the Staten Island Rapid Transit railroad; has three libraries, containing nearly 10,000 volumes, two large hotels; has the largest cotton storage warehouses on New York harbor, and wall-paper and silk-printing factories. Population 1890, 16,423. See NEW BRIGHTON, Vol. XVII, p. 372.

NEW BRITAIN, a town of Connecticut. It contains 12 churches, a Roman Catholic cathedral, a state armory, a state normal school, a high-school, and two libraries, containing over 16,000 volumes. Population 1890, 19,007. See NEW BRITAIN, Vol. XVII, p. 372.

NEW BRUNSWICK. The province of New Brunswick, of which an account may be found in Vol. XVII, pp. 373-375, has the following more recent history: Its population in 1891 was 321,263, the same as in the previous decennial census. The various Protestant bodies include about two-thirds of the population, the Roman Catholics one-third. The Indian population was, in 1894, 1,618, many of whom engage in farming and lumbering pursuits, and a moiety of whom attend schools. These belong to the Micmac and Malicite tribes. Large tracts of the province are still heavily wooded, that portion lying adjacent to the province of Quebec being hilly and rugged. The province is well supplied with railways, the Intercolonial traversing it from north to south, and the Canadian Pacific, the Canada Eastern, the Short Line and other roads traversing it laterally.

Lumbering is the chief industry of the province, the area of forest and woodland in 1893 being nearly 15,000 square miles. In the same year there were 5,673 square miles under lease to lumbermen, yielding revenue, for the year, \$106,507. The entire timber cut in 1893, in the province, was considerably over 100,000,000 feet, chiefly pine, spruce, hemlock and cedar. Fisheries are another source of wealth in New Brunswick, the value of the catch for 1893 being nearly \$4,000,000. The number of men engaged in the industry for the same year was, on board vessels, 819, and in boats, 10,831. The value placed, in 1894, on the equipment, including vessels, boats, nets, fishhouses, etc., was \$1,680,912. The value of the fish exported for the year was \$756,000. The value of the forest products exported exceeded \$5,500,000. In 1894 the province had vessels engaged in the coasting-trade of over 1,000,000 gross tonnage.

The live-stock owned in the province, in the year 1891, included horned cattle, 202,439; horses, 59,586; sheep, 181,110; swine, 51,093. The figures representing the horned cattle show a decrease since the last census; the other live-stock show a slight increase. New Brunswick

possesses only about half the number of industrial establishments possessed by her sister province of Nova Scotia, with about two-thirds the gross capital, there being 5,429 in 1891, including five cotton-mills, two rolling-mills and several foundries, with nearly \$16,000,000 working-capital. The value of the articles manufactured for the same year was close upon \$24,000,000. The value of the total foreign exports of the province in 1893 amounted to a little over \$7,000,000, and that of imports \$5,250,000, \$2,000,000 worth being free goods. The gross revenue for the year amounted to \$730,777, or \$2.27 per head of the population. Of this sum, \$483,564 was derived from the Dominion subsidy, the remainder accruing from fishing-rights, fees and crown timber leases. The debt of the province was, in 1894, \$2,821,484, against assets of only \$568,654.

New Brunswick has now but one legislative chamber, the legislative council, or upper house, being abolished in 1892. There are 44 members, representing the population of the 16 counties, including an executive of 7 members, 2 of whom are without office. A lieutenant-governor is officially the head of the government, the seat of which is Fredericton. The province is represented in the Federal Parliament at Ottawa by 10 members in the Senate and by 16 members in the Commons. Education is represented by the University of Brunswick and its collegiate school, maintained by the province. There are two other colleges under the control of denominations, besides a normal school for the equipment of teachers, supported by government. There are, also, 14 grammar schools, with an average attendance of 500, with 68 teachers and assistants. In 1893 there were 1,614 public schools in operation, with an average attendance of 36,000, and 1,693 teachers. The total amount raised by the province for the purposes of education was, in 1893, \$446,188, made up as follows: Legislative grant, \$170,581; county fund appropriation, \$94,430; and district assessment, \$181,177.

NEW BRUNSWICK, a city and the capital of Middlesex County, north-central New Jersey, 31 miles S.W. of New York, on the Pennsylvania and the Raritan River railroads, and at the head of navigation of the Raritan River. Population 1890, 18,603; 1895, 19,910. See also NEW BRUNSWICK, Vol. XVII, p. 375.

NEWBURG, a city and the capital of Orange County, New York, on the Erie and the West Shore railways. The city contains a free library, a Y.M.C.A. library, the Second Judicial District Law Library, a Home for the Friendless, St. Luke's Home, a Home for Children, an academy and a hospital. Population 1890, 23,087. See also NEWBURGH, Vol. XVII, p. 375.

NEWBURYPORT, a city of Massachusetts. It contains the Putnam Free School, Anna Jaques Hospital, the Y.M.C.A. Memorial Building, Old Ladies' Home, high, training and graded public schools, a public library containing 31,150 volumes, and a Marine Museum. Population 1890,

13,947; 1895, 14,552. See also NEWBURYPORT, Vol. XVII, p. 375.

NEW CANAAN, a village of Fairfield County, southwestern Connecticut, 16 miles W.S.W. of Bridgeport, on the New York, New Haven and Hartford railroad; a summer resort of New York business men, being delightfully situated among hills which range from 200 to 500 feet high; manufactures shirts, clothing and shoes. Population 1890, 2,701.

NEWCASTLE, a city and the former capital of Newcastle County, northeastern Delaware, five miles S. of Wilmington, on the Baltimore and Ohio railroad, and a port of entry on the Delaware River. The neighboring farm-land is very fertile; wheat, peaches, hay, oats, Indian corn and butter are staple articles. It has manufactures of cotton and woolen goods, carpets, agricultural implements and rolling-mill products. Population 1890, 4,010.

NEWCASTLE, a town and the capital of Henry County, eastern central Indiana, 26 miles W.N.W. of Richmond, on Blue River, and on the Cleveland, Cincinnati, Chicago and St. Louis, the Lake Erie and Western and the Pittsburg, Cincinnati, Chicago and St. Louis railroads; in an agricultural region, and contains important manufactures of furniture, carriages, brick and lumber. Population 1890, 2,697.

NEWCASTLE, a village of Northumberland County, New Brunswick, Canada, on the left bank of the Miramichi River, 90 miles N.N.E. of Fredericton, on the Intercolonial railroad. It is a port of entry; has a trade in lumber and fish; a shipyard and tannery are here. Population 1890, 4,006.

NEWCASTLE, a city of Pennsylvania, on the Erie, the Pennsylvania, the Pittsburg and Lake Erie, and the Pittsburg and Western railroads; has three national banks with a combined capital of \$500,000, two colleges, a library and two daily papers. Population 1890, 11,600. See also NEWCASTLE, Vol. XVII, p. 380.

NEW CONCORD, a village of Muskingum County, southeastern Ohio, eight miles W. of Cambridge, on the Baltimore and Ohio railroad; contains Muskingum College (United Presbyterian), founded in 1837, a co-educational institution, which had, in 1896, 19 instructors, 402 pupils and a library containing 2,000 volumes. Population 1890, 700.

NEWCOMB, SIMON, an American astronomer, born in Wallace, Nova Scotia, March 12, 1835; educated at Lawrence Scientific School, Harvard. In 1861 he taught mathematics in the United States navy; was appointed to the Naval Observatory at Washington, and in 1877 edited the official *American Ephemeris and Nautical Almanac*. He organized the government expedition to observe the transit of Venus in 1874, and in 1882 observed the transit of the same planet at the Cape of Good Hope; he had already been sent to Saskatchewan and to Gibraltar to observe eclipses of the sun. In 1884 he undertook, in addition, the duties of the chair of mathematics

and astronomy in Johns Hopkins University. His writings embrace memoirs and mathematical text-



PROF. SIMON NEWCOMB.

books and include most exact tables of the motions of the planets Uranus and Neptune. He contributed the articles *ASTRONOMY*; *OBSERVATORIES*; and *TELESCOPES*, to these Supplements, and the article *MOON*, in this *ENCYCLOPÆDIA*. See also *NEBULAR THEORY*, Vol. XVII, p. 311.

NEW CUMBERLAND, a village of Hancock County, southwestern West Virginia, 32 miles N. of Wheeling, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad, and on the Ohio River; has gas-wells and extensive manufactures of fire-brick. Population 1890, 1,400.

NEW DECATUR, a town of Morgan County, northern Alabama, 2 miles S. of Decatur and 25 miles S. of Athens, on the Louisville and Nashville railroad; a suburb of Decatur, and has many fine residences. Population 1890, 3,565.

NEWELL, ROBERT HENRY, an American author; born in New York City, Dec. 13, 1836; engaged in literary pursuits in New York, being on the editorial staff of the *New York Mercury* (1858-62); of the *New York World* (1869-74); and editor of *Hearth and Home* (1874-76). He published, during the Civil War, a series of papers under the name of Orpheus C. Kerr (by which he meant "office-seeker"), which attracted attention and which were collected and published in four volumes as *The Orpheus C. Kerr Papers* (1862-68). Beside these he published *The Palace Beautiful*, and *Other Poems* (1864); *The Martyr President: A Poem* (1865); *Avery Glibun; or, Between Two Fires* (1867); *Smoked Glass* (1868); *The Cloven Foot*, an adaptation of *The Mystery of Edwin Drood* (1870); *Versatilities* (1871); *Studies in Stanzas* (1882); *There Was Once a Man* (1884).

NEW ENGLAND, a collective name given to the six Eastern states of the United States—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut—embracing an area of 65,000 square miles. The joint population in 1890 was 4,692,904. This is more than one thirteenth of the entire population of the republic, while the area of New England is less than one fiftieth of the total area of the United States.

NEWFOUNDLAND, a British colony; for a general article upon which, see Vol. XVII, pp. 382-386.

There were, in 1896, 18 electoral districts, returning 36 members. The governor receives a (reduced) salary of \$7,000; each member of the legislative council receives \$120 per session, and members of the House of Assembly \$200 to \$300, according as they are resident in or out of St. John's. The 18 electoral districts are arranged so that 7 of them return three members, 4 two members, and 7 one each.

Of the population, 69,824 belong to the Church of England, 72,696 are Roman Catholics, 53,276 are Methodists, 1,449 are Presbyterians and 4,795 belong to other denominations. The total number of aided schools in 1891 was 547, with 32,339 pupils, the government aid being \$129,200.

The revenue for 1894 was \$1,499,469, and the expenditure \$2,236,308. The total exports in the same year amounted to \$5,811,169, and the imports to \$7,164,738. The chief export is dried cod, the value of which was \$3,703,338; the other exports being cod and seal oil, sealskins, preserved lobsters, iron pyrites, copper ores and regulus. The leading imports consist of flour and woolens, cottons and canvas, etc. The total tonnage of vessels clearing in 1894 was 876,703, of which 835,987 was British.

Fishing is the principal occupation, the value of the annual catch being over \$5,000,000. Asbestos is mined on the west coast; lead and silver are obtained, and an extensive coal-field has been discovered near Grand Lake, in the west. Ship-building and lumbering are increasing.

There were 86 miles of railroad opened in 1887 from St. John's to Harbor Grace; and in 1888 an additional 25 miles, being a branch line to Placentia; 200 miles to Exploits Bay and Hall's Bay were later completed, and a further extension to the west coast by the Bay of Islands, St. George's Bay and Port Basque Bay, with a total of about 600 miles, the cost of which was estimated at \$16,000 per mile.

There is a regular fortnightly mail-steamer service (except from February to April) around the island, and with the American continent, Prince Edward Island, and also Liverpool. The landing-place of the Transatlantic cables is at Heart's Content Harbor, an inlet of Trinity Bay. The American cable starts from Placentia.

A great impetus was given to agriculture by legislation. In 1891 there were 64,496 acres under cultivation, the chief products being potatoes, turnips and other root crops, and hay, barley and oats. The number of live-stock has been doubled within the last twenty years.

The "shore fishery" has been a continued source of trouble in the colony. In 1887 a petition was sent to the imperial government in regard to the encroachments of the French. A bill dealing with the matter was introduced into Parliament, but was rejected. The matter then became the subject of diplomatic action between Great Britain and France. The French fishermen, being aided by a bounty, were able to undersell the Newfoundlanders in foreign markets, so, to counteract this, an act was passed by the colonial government to prevent the sale of bait to French fishermen. This act was vetoed by the imperial government, but was eventually allowed, on the earnest solicitation of the colonists. The result was that within two years the fish-product was increased twenty per cent through the operation of this law. Matters looked so serious in 1889 that the British and French governments

entered into a temporary *modus vivendi* in the early part of 1890, with the view of settling the whole dispute by treaty. This action gave great offense to the colony. In 1891 the commander of the British war-ships on the coast attempted to enforce the *modus vivendi* by closing down some lobster factories, but upon an appeal to the courts it was found that the naval commander had exceeded his authority. This led to the introduction into the House of Lords of a measure providing such authority, whereupon the colonists sent delegates to London, to be heard at the bar of the Upper House. The occasion of their making their appeal was historic, and the audience was brilliant. The claims of the colonists were allowed. The obnoxious measure was withdrawn on the condition that the colonial legislature would recognize the *modus vivendi* for a limited time. Since then the matter has remained unsettled, the *modus* being renewed from time to time and arbitration delayed. The shore-fishing, however, is now of little importance to France, there being only seven French fishing-vessels engaged in the industry in 1889.

The main operations of the French fishermen are on the banks, and are carried on from the Isles of St. Pierre and Miquelon, at the mouth of Fortune Bay, on the south coast, these islands being ceded to France in 1793, by the Treaty of Paris. A fleet of more than two hundred vessels, each of from one hundred to four hundred tons, sails from France annually, in the spring. The annual value of the fishing on the banks amounts to over two millions of dollars. In 1871 United States fishermen were, by treaty, granted rights of fishing in Fortune Bay (q.v., in these Supplements).

In 1892 St. John's, the capital (population 1891, 25,700) was swept by a disastrous fire, which broke out July 8th, the amount of damage being estimated at from \$15,000,000 to \$20,000,000. Relief was immediately promised and secured, the Mansion House fund being promptly handed over to the sufferers. Building commenced soon after the fire and great progress made in putting the new portion of the city in a much more improved state than before.

The general election of 1893 resulted in the return to power of Sir William Whiteway, but wholesale bribery was alleged against 17 of his colleagues. The seats were contested, proceedings taken in the courts and two members were unseated. Then the premier recommended the dissolution of the legislature, but this was refused by the governor. The proceedings against the others were then taken, and all except two were unseated, the number including Sir W. Whiteway himself and the ex-speaker. The former resigned, but after a stormy political year the Whiteway party was again in the majority, and in December the ministry of A. F. Goodridge resigned, being succeeded by that of D. J. Green, who introduced a bill to relieve the impositions, on account of the bribery trials, on Sir W. Whiteway and his colleagues. Then, in January, Mr.

Green resigned and Sir William Whiteway again took office.

During the ministry of Mr. Green the colony had encountered a financial panic by the failure of the Commercial Bank of St. John's, the Union Bank of Newfoundland and the Savings Bank. The cause of this unsound condition of affairs was the credit or "truck" system, under which the fishery business was for generations conducted, by a system of notes backed by only a small foundation of actual money. A legislative commission found that the Union bank was solvent, but that the Commercial was hopelessly insolvent. A bill was carried by which the government guaranteed, in the case of the Union Bank, eighty cents, and in the case of the Commercial, twenty cents, on the dollar of the total note issue. The Union bank was found to have liabilities to the amount of \$3,464,900 and assets to the amount of \$3,174,778. Some relief was also secured by the establishment of branches of the Banks of Montreal and of Nova Scotia in St. John's. With the greatest difficulty a loan of \$2,500,000 was secured from London through Montreal. Severe retrenchments of all kinds were enforced. In this way a reduction of \$480,000 was effected, or nearly one fourth, in expenses, replacing the customary deficit with a surplus of \$200,000. In selling its bonds, the colonial secretary agreed to a sinking-fund provision by which a certain portion of the bonds could be paid every half-year at their market, instead of their par, value. The bonds sold at 94, but soon had a market value of 116. The needless loss consequent upon this transaction was keenly felt. The total public debt at this time was \$17,000,000, or more than \$400 for every family in the colony. A considerable portion of this debt was incurred in connection with the building of the western railroad, above noted.

Under these embarrassing conditions the negotiations for joining the Dominion, the measures for effecting which have been well considered, will no doubt be delayed.

NEWGATE, a celebrated London prison, stands at the western extremity of Newgate Street, opposite the Old Bailey. It is now used for the temporary detention of prisoners awaiting and during trial in the Central Criminal Court, in the vicinity, and also for criminals condemned to death, the death penalty (hanging) being there carried out. The exterior presents high, dark stone walls, without windows.

NEW GUINEA OR PAPUA. Great changes have occurred in the proprietary jurisdiction of the island. The half lying west of the 141st meridian has been assigned to the Netherlands. (See NETHERLANDS, in these Supplements.) The northern section of southeast New Guinea, comprising an estimated area of 72,000 square miles and a population of 110,000, was named Kaiser Wilhelm's Land, and was declared to be under a German protectorate in 1884. The present English territory in New Guinea starts from the northeast coast, on the 8th parallel of south lati-

tude, and follows it to its intersection with the 147th meridian; thence northwest to the intersection of the 5th degree of south latitude with the 144th degree of east longitude; thence west-northwest to the intersection of the 5th degree of south latitude and 141st degree of east longitude. The adjacent islands north of lat. 8° S. are German; those south of that latitude are English. The English territory has an estimated area of 88,460 square miles and a population of 350,000, with Port Moresby as the official center. For general article embracing the early history, see NEW GUINEA, Vol. XVII, pp. 386-390.

NEW HAMPSHIRE has an area of 9,305 square miles, of which 300 are water surface, leaving the



STATE SEAL OF NEW HAMPSHIRE.

land area 9,005 square miles, or 5,763,200 acres. In 1890 the population was 376,530; that of 1880 was 346,991, the gain being equal to an increase of 8.51 per cent. The rank among the states in population in 1890 was thirty-third, that of 1880 was thirty-first. In 1890 the density of population was 41.81 to the square mile,—an increase from 38.53 to the square mile in 1880. The eleventh decennial census showed New Hampshire to have five cities of 8,000 and upward in population, in which resided 103,058 of the citizens of the state, thus making the urban population 27.37 per cent of the entire number of inhabitants. The same authority showed the number of males to have been 186,566, the number of females, 189,964; the percentage of native-born citizens was 80.79, and the number of negroes 614,—a loss of 71 since 1880.

New Hampshire had, in 1889, 61,498 acres devoted to the cereals, the product in bushels having been 2,115,629. Of the total acreage devoted to the cereals, 38.61 per cent was in corn, 43.28 under oats, 8.02 under barley, 3.30 under wheat, 5.07 under buckwheat and 1.72 under rye. During the decade 1880-90 the number of farms in New Hampshire decreased from 32,181 at the former period to 29,151 at the latter. The improved lands in farms decreased during the same period almost 600,000 acres, and the percentage of unimproved land in farms increased from 37.97 to 50.06. The total valuation of lands, buildings, fences, farm implements and machinery and live-stock was, in 1890, \$80,207,575,—a loss of about \$7,500,000 since 1880. The number of horses in 1890 was 52,458,—an increase from 46,773 in 1880; the total number of cattle decreased from 232,405 to 222,888, the number of milch cows increased from 90,564 to 109,423, and the number of sheep decreased from 211,825 to 131,611.

In 1890, New Hampshire had 3,229 specified manufacturing industries, in which capital was invested to the amount of \$79,375,160, persons to the num-

ber of 63,361 were employed, to whom wages to the amount of \$24,248,054 were paid, and from which products aggregating \$85,770,549 were turned out. Cotton goods led in value of product, the same being \$21,958,002, followed by boots and shoes to the value of \$11,986,003, and woolen goods \$8,004,264. Other industries of importance were worsted goods, lumber and other mill products, hosiery and knit goods, leather (tanned and curried), flouring and grist mill products, foundry and machine-shop products and furniture (factory product).

The report of the state treasurer for the fiscal year ending May 31, 1895, showed the receipts for the year to have been \$1,729,904, which, added to the balance on hand at the beginning of the year, made the amount in the treasury, June 1, 1895, \$2,051,931. The net indebtedness of the state, June 1, 1895, amounted to \$2,026,300. The largest items of revenue were state tax, \$500,000; railroad tax, \$128,916; insurance tax, \$18,281. The total assessed value of property in the ten counties of the state was \$199,332,113. The addition of railroad and other taxable property brought the aggregate up to \$286,756,618, which was to continue as the basis of apportionment of the state taxes from 1895 to 1900.

In 1895 the total railway mileage of New Hampshire was about 1,165 miles. The Mount Washington railway, running from the base to the summit of Mount Washington, a distance of 3.333 miles, is remarkable for its maximum grade of 1,980 feet to the mile and its extreme curve of 497 feet radius. The cost of construction, equipment and land made a total investment of \$221,500. The gross earnings from operation for 1895 were \$22,444, and the operating expenses \$11,898, leaving a net income from operation of \$10,545.

The number of financial institutions under the control of the board of bank commissioners in December, 1895, was as follows: Two state banks, 67 savings banks, 13 trust companies, 17 building and loan companies. The savings banks reported assets and liabilities amounting to \$71,710,241; the total amount of deposits was \$66,746,702; the surplus, \$219,845. The number of open accounts was 163,870, while in the savings departments of the trust companies of the state the number of depositors was 7,050. The two state banks reported assets and liabilities amounting to \$205,585, gross earnings for the year approximating \$10,000, and loans outstanding aggregating \$100,000. The total assets of the building and loan associations, Oct. 31, 1895, reached \$1,592,010,—an increase for the year of \$223,782. Their loans on real estate amounted to \$1,472,522, and on shares to \$34,740. The amount of loans paid during the year was \$60,097, the dues received for this period were \$139,247, the profits withdrawn were \$19,428, shares returned were \$41,528, and the profits on retired shares were \$14,314.

The number of public schools in New Hampshire at the beginning of 1895 was 2,222, the average attendance of the year preceding having been 42,030. In addition, 7,425 pupils were reported as attending private-schools. The whole number of male teachers was 280, of female teachers 2,907; the average wages

of the former, \$49.78 per month, and of the latter, \$27.36. The total annual expenditures in the maintenance of the public schools of the state is about \$1,000,000.

At the opening of 1895 there were 402 patients in the State Asylum for the Insane. In November of that year there was opened for occupancy an addition to the asylum, intended for convalescents, which had been erected at a cost of about twenty thousand dollars. The Orphans' Home at Franklin had 135 inmates, June 1, 1895, maintained at a cost, for the year preceding, of \$10,000. Twenty-five thousand dollars was appropriated in 1895 for the Soldiers' Home, a portion being for building and furnishing a hospital. At the beginning of 1895 the state prison had 172 inmates. The expenditures for the fiscal year ending Nov. 30, 1894, had amounted to \$24,000, the earnings of the prisoners to \$11,412.



CAPITOL BUILDING, CONCORD.

New Hampshire has 11 fish-hatcheries, the largest number of any of the states of the Union. Close enforcement of the laws relating to fish and game has resulted in abundance of both, especially of deer, and they are now more plentiful than for many years, although threatened with extinction before the passage of the protecting laws.

In 1891, \$225,000 was appropriated for the erection of a state library, which was completed and dedicated Jan. 8, 1895. About 40,000 volumes had been gathered into the new library by Jan. 1, 1896. The building is one of the handsomest structures devoted to a like purpose in the United States, and is constructed almost entirely of redstone, Concord granite and green granite.

The National Guard of New Hampshire in 1895 was made up of an actually organized force of 120 commissioned officers, 1,120 infantry, 64 cavalry and 74 artillery. The infantry is divided into 3 regiments, each consisting of 2 battalions of 4 companies each. The cavalry is combined into one troop and the artillery into one battery, the entire military force of the state being formed into one brigade. The annual state appropriation is \$30,000, the Federal donation of arms and accouterments ranging from \$5,000 to \$2,000, \$3,450 being the amount donated in 1894.

On Jan. 1, 1896, there were 148 newspapers published in New Hampshire. One or more were published in all of the 10 counties of the state, in 14 county seats, and in 62 of the cities, towns and villages. Fifteen papers were daily, 1 triweekly, 2 semi-weekly, 118 weekly, 1 fortnightly and 11 monthly.

In 1890 there were 783 church organizations in New Hampshire, with 774 edifices, a membership of 102,941,—27.34 per cent of the population of the state,—and church property of the value of \$4,457,225. There were 24 denominations represented in the count, of which the principal ones were the Adventists, with 47 organizations; all Baptist bodies, 179; Roman Catholic, 68; Congregationalists, 188; all Methodists, 134; Protestant Episcopal, 44; and Universalists, 33.

The principal cities and towns of New Hampshire, with the populations as given in the census of 1890: Manchester, 44,126; Nashua, 19,311; Concord, 17,004; Dover, 12,790; Portsmouth, 9,827; Keene, 7,446; Rochester, 7,396; Somersworth, 6,207; Laconia, 6,143; Claremont, 5,565; Exeter, 4,284; Franklin, 4,085.

The following is a list of the governors of New Hampshire from 1775, with their respective terms of office: Meshech Weare, 1775-85; John Langdon, 1785-86; John Sullivan, 1786-88; John Langdon, 1788-89; John Sullivan, 1789-90; Josiah Bartlett, 1790-94; John Taylor Gilman, 1794-1805; John Langdon, 1805-09; Jeremiah Smith, 1809-10; John Langdon, 1810-12; William Plumer, 1812-13; John Taylor Gilman, 1813-16; William Plumer, 1816-19; Samuel Bell, 1819-23; Levi Woodbury, 1823-24; David L. Morrill, 1824-27; Benjamin Pierce, 1827-28; John Bell, 1828-29; Benjamin Pierce, 1829-30; Matthew Harvey, 1830-31; Joseph M. Harper, 1831; Samuel Dinsmore, 1831-34; William Badger, 1834-36; Isaac Hill, 1836-39; John Page, 1839-42; Henry Hubbard, 1842-44; John H. Steele, 1844-46; Anthony Colby, 1846-47; Jared W. Williams, 1847-49; Samuel Dinsmore, 1849-52; Noah Martin, 1852-54; Nathaniel B. Baker, 1854-55; Ralph Metcalf, 1855-57; William Haile, 1857-59; Ichabod Goodwin, 1859-61; Nathaniel S. Berry, 1861-63; Joseph A. Gilmore, 1863-65; Frederick Smythe, 1865-67; Walter Harriman, 1867-69; Onslow Stearns, 1869-71; James A. Weston, 1871-72; Ezekiel A. Straw, 1872-74; James A. Weston, 1874-75; Person C. Cheney, 1875-77; Benjamin F. Prescott, 1877-79; Nathaniel Head, 1879-81; Charles H. Bell, 1881-83; Samuel W. Hale, 1883-85; Moody Currier, 1885-87; Charles H. Sawyer, 1887-89; David H. Goodell, 1889-91; Hiram A. Tuttle, 1891-93; John B. Smith, 1893-95; Charles A. Busiel, 1895-97; George A. Ramsdell, 1897. See also NEW HAMPSHIRE, Vol. XVII, pp. 390-393.

NEW HAMPTON, a town and the capital of Chickasaw County, northeastern Iowa, 39 miles N. of Waterloo and 46 miles N.N.W. of Independence, on the Chicago, Milwaukee and St. Paul railroad, the trade center of a rich farming region. Population 1890, 1,314; 1895, 1,619.

NEW HANOVER, an island of the Bismarck Archipelago, lying off the northeast coast of New Guinea, and having an area of 570 square miles.

Its physical characteristics resemble those of New Britain.

NEW HARMONY, a town of Posey County, southwestern Indiana, 15 miles N. of Mount Vernon, on the Peoria, Decatur and Evansville railroad. This town is principally noted as having been, in 1825, the home of Robert Owen, who succeeded George Rapp in a socialistic undertaking. He failed, however, in converting the inhabitants of New Harmony to his views and left after a couple of years. The town has a fine public library, which was erected at a cost of \$14,000, the building containing, besides the library of seven thousand volumes, an art gallery and a museum. It has saw, planing and flour mills. Population 1890, 1,197.

NEW HARTFORD, a town of Litchfield County, northwestern Connecticut, 15 miles N.W. of Hartford, on the Farmington River, and on the New York, New Haven and Hartford and the Philadelphia, Reading and New Haven railroads; has nine public schools, a Roman Catholic parochial school, cotton-mills, a plane, rule and level factory and a hosiery factory. It is located in a good tobacco-growing and general farming country. Population 1890, 3,160.

NEW HAVEN, a city and the capital of New Haven County, Connecticut. The United States census for 1890 gives the following statistics of manufactures: Number of industries, 1,129; capital invested, \$19,592,384; wages paid annually, \$10,096,820; total value of products, \$33,396,311; average number of employees, 17,864. New Haven has now 68 churches and 13 banks, of which 7 are national, 3 state and 3 savings; a building and loan association. It is now governed by three corporations: The city of New Haven, the town of New Haven and the New Haven school district. It has 24 aldermen and 36 councilmen. Population 1890, 86,045. See also **NEW HAVEN**, Vol. XVII, p. 394.

NEW HOPE CHURCH, BATTLE OF. See **AL-LATONA**, in these Supplements.

NEW IBERIA, a town and the capital of Iberia Parish, southern Louisiana, 12 miles N. of Vermilion Bay, on the Southern Pacific railroad and on the Bayou Teche. Its principal industries are sugarcane, rice and cotton growing. It has a convent, two public schools, Howe Institute and a seminary. Population 1890, 3,447.

NEW IRELAND. See **NEW BRITAIN**, Vol. XVII, p. 372; and **NEW MECKLENBURG**, in these Supplements.

NEW JERSEY had a population in 1890 of 1,444,933; that of 1880 having been 1,131,116. The increase during the decade was equal to 27.74 per cent, which was 2.88 per cent greater than the average percentage of increase of the United States for the period, and 7.79 per cent greater than the increase of the North Atlantic division of states. The rank occupied by New Jersey in 1890 was eighteenth, that of 1880 having been nineteenth. The density of population at the time of the taking of the eleventh decennial census was 193.82 to the square mile,—an increase since the taking of the preceding census from 151.73 to the square mile. The number of cities within the state having a population of 8,000

or over, in 1890, was 20, in which resided 780,912 of the citizens of the state, constituting 54.04 per cent of the entire population. In 1880 the number of cities of the same class was 12, their population 495,650, and the urban population con-



STATE SEAL OF NEW JERSEY.

stituted 43.82 per cent of the whole. In 1890 the male inhabitants numbered 720,819, the female 724,114; the percentage of native-born citizens of the state was 77.23; the number of negroes, 47,638, an increase of 8,785 during the preceding ten years. The latest official surveys of New Jersey give the total area as 7,815 square miles, of which 360 are water surface and 7,455 land surface.

In the area devoted to the cereals, New Jersey ranked, in 1890, thirtieth among the states and territories of the Union. The acreage reported was 601,357, of which 44.51 per cent was under corn, 20.22 under wheat, 20.17 under oats, 12.84 under rye, 2.25 under buckwheat and .01 under barley. The total production of the cereals amounted to 14,287,404 bushels, corn leading with 8,637,011 bushels, oats coming next with 2,837,293 bushels, followed by wheat with 1,823,382 bushels; rye returned 874,049 bushels, buckwheat 114,626 bushels and barley 1,043 bushels. The number of farms decreased from 34,307 in 1880 to 30,828 in 1890, the improved land decreased almost 100,000 acres, and the unimproved land increased very nearly 200,000 acres. The total value of lands, fences, buildings, farm implements and machinery and live-stock fell off from \$212,678,330 in 1880 to \$182,452,914 in 1890. The number of horses in 1890 was 86,925,—a decrease of 15 since 1880; the number of mules and asses was 8,227 in 1890, 9,267 in 1880; the number of cattle of all kinds was 212,062 in 1890, 223,886 in 1880; the number of milch cows was increased from 152,078 in 1880 to 161,576 in 1890; the number of swine was increased from 219,069 in 1880 to 224,388 in 1890, and the number of sheep was decreased from 117,020 in 1880 to 55,409 in 1890. For 1890 the wool product amounted to 180,844 pounds; the gallons of milk numbered 64,003,953; the pounds of butter were 8,367,218; the acres in meadow were 458,267, from which were mown 661,791 tons of hay; 4,055,851 bushels of Irish potatoes and 2,254,344 bushels of sweet potatoes were produced; and in addition to the foregoing, grass-seeds, tobacco, broom corn and many varieties of pulse were produced.

The proximity of favorable markets has stimulated the vegetable and fruit raising industry. Among the latter, peaches, apples and grapes are the staples, while in vegetables every variety produced in the temperate zone is raised and marketed with profit.

In 1890 New Jersey stood sixth in rank among the

states in the value of manufactured products, in the average number of employees, and in the total annual wages paid. The census returns showed the number of specific manufacturing industries to be 9,225, the amount of capital invested to amount to \$70,375,160, the average number of employees to have been 187,398, to whom wages to the amount of \$96,778,736 were paid, while finished products to the amount of \$354,573,571 were turned out. The principal lines, with the amount invested, the number of employees, the wages paid and the total value of finished products are shown in the following table:

INDUSTRY.	CAPITAL.	WORKERS.	WAGES.	PRODUCT.
Silk and silk goods -----	\$16,809,927	17,917	\$7,176,180	\$30,760,371
Petroleum-refining -----	16,500,739	2,703	1,618,501	20,711,826
Foundry and machine-shops -----	19,084,636	13,432	7,957,672	21,666,955
Malt liquors -----	10,184,450	1,395	1,408,932	10,018,393
Slaughtering, wholesale and packing -----	1,825,650	743	625,888	17,813,166
Iron and steel -----	9,025,046	4,056	2,162,304	8,139,321
Hats and caps -----	2,655,707	6,688	3,568,242	8,533,729
Chemicals -----	7,931,419	1,884	1,184,809	8,146,795

In addition to the above, the following industries each yielded a return exceeding five million dollars: Boots and shoes (factory product), cars and general shop construction, clay and pottery products, cotton goods, dyeing and finishing textiles, flouring and grist mill products, glass, leather (patent and enameled) and woolen goods.

New Jersey has a great diversity of minerals, standing among the first ten states in the amount of iron ore annually produced, supplying the greater part of the zinc oxide and metallic zinc used in the United States, annually producing granite to the value of nearly half a million dollars, sandstone of about the same value, limestone in excess of one hundred thousand dollars in value, and ochre and mineral paint to a large amount. For building purposes, very fine gneiss, white and blue limestones, roofing-slates and flag and paving stones are quarried in abundance. Large quantities of graphite or plumbago, porcelain and pottery clays, infusorial earth, molding sand, sulphate of baryta, manganese, iron pyrites, greensand and many other commercial products are found in abundance among the mineral deposits of the state, which lack only coal to be complete in variety.

The report of the state treasurer for the fiscal year ending Oct. 31, 1895, showed the total receipts for the year to have been \$2,175,931, the disbursements \$2,269,039, which, deducted from the receipts and balance on hand at the beginning of the term, left a balance on hand at the close of the year amounting to \$893,747. Jan. 1, 1895, the total state debt amounted to \$660,400, none of which was due and payable, and some of which was not due until 1902.

The reported value of the fisheries of the state for the year 1889 was \$3,130,893, New Jersey standing fifth in rank among the states in this connection. The total number of persons to whom the boat-fishery industry gave employment was 3,342,—a greater number than were similarly employed in any other

state. The total amount invested in the business was \$271,186, the rank in this connection being that of third, while the value of the products, \$1,019,508, was greater than that of any other state. In the sea-fishery industry the rank is not so high, but a large business is done in cod, lobster, shad, alewife and oyster fisheries, the total value of the last-named exceeding one and one half million dollars annually. The value of the annual catch of shad and alewife exceeds, on an average, \$600,000.

A census of the children of school age was taken by legislative sanction in 1894, and revised in 1895 to meet changes made in the laws and in the boun-

daries of school divisions. The count of 1894 showed 439,248 children between 5 and 18 years of age attending the public schools, and 87,249 between the same ages not attending school. The report of the state superintendent of education for the school year 1894-95 showed the following facts: Number of male teachers, 756; average salary per month, \$82.59; number of female teachers, 4,628; average monthly wages, \$47.04; number of school buildings, 1,780; total value school property, \$11,819,712; total enrollment in the public schools, 274,270; average daily attendance, 172,465; average time of school term, 9 months and 12 days. In addition to the admirable free-school system, New Jersey maintains several institutions for advanced education. Among these may be named the normal and model schools, the latter being self-supporting. The appropriation for the normal school for 1895 was \$42,493; the number of graduates during the year, 134, all of whom became teachers within the state. The enrollment for the year was 537, and since the institution of the school in 1855 the number of graduates up to 1896 was 1,776. The Farnum Preparatory School at Beverly had expenses, during the year, aggregating \$5,416, \$1,200 of which was paid by the state, the remainder coming from interest on endowment, tuition and balance carried over. The Newark Technical School received, in 1895, \$5,000 from the state, and for the purpose of industrial education and manual training the appropriation was \$32,326. Many colleges of the state occupy high positions among the institutions of learning of this country, prominent among them being Princeton University (q.v., in these Supplements). Among the sectarian institutions of learning in New Jersey are two under the control of the Roman Catholic Church, the Seton Hall College at South Orange and St. Benedict's College at Newark. Rutgers College, located at New Brunswick, is non-sectarian.

At the beginning of 1896 there were 26 savings

banks in the state, whose combined resources amounted to \$43,817,114. The number of depositors or open accounts was 154,334, the average of each account being \$256.82. Twenty-one banks of deposit and discount, operating under the state laws, reported, for the same period as the savings banks, total resources of \$10,651,701, their loans and discounts exceeding \$7,500,000. Nineteen safe deposit and trust companies, with capital varying between \$25,000 and \$350,000, reported to the commissioner. Their combined resources amounted to \$19,502,432, and the number of depositors was 39,397. The national banks numbered about 100, with aggregate capital approximating \$15,000,000, and individual deposits of nearly \$50,000,000.

In 1895 there were 4,525.185 miles of railroad tracks in the state, assessed at a valuation of \$220,705,822, and paying taxes to the amount of \$1,514,411. The miles of canal and feeders in the state were, at the same time, 173.340. The gross earnings of the entire railroad system of the state approximated \$40,000,000,—a decrease, as compared with the previous year, of more than \$2,500,000. In this connection, the report as to corporations within the state is of interest. In 1885 the number of corporations assessed was 797; the amount of taxes assessed, \$235,769; in 1895 the number had reached 4,450, the amount of tax assessed being \$1,092,744.

The state institutions of New Jersey were all in excellent condition at the opening of 1896. The



CAPITOL BUILDING, TRENTON.

School for Deaf Mutes, located at Trenton, had a total of 126 pupils,—65 boys and 61 girls. The appropriation for 1895 amounted to \$55,139. During the year the state maintained 51 blind persons at the following-named institutions, having no provision for their support within the state:

New York Institution for the Blind, New York City.....33
 Pennsylvania Institution for the Blind, Philadelphia....16
 Connecticut School for Imbeciles, at Lakeville, Conn... 2

The total cost was \$14,351, an average of about \$282 for each person.

At Vineland is the School for Feeble-Minded Children, which, during 1895, had 198 pupils, the total cost of maintenance being \$50,180, or about \$253 per pupil. The Home for Feeble-Minded Women is also at Vineland. The patients during 1895 numbered 88, and the cost of maintenance was \$21,790. There are two insane hospitals,—one located at Trenton, having, late in 1895, 1,001 in-

mates, and one located at Morris Plains, having at the same time 1,116. The expenses of the first-named institution for 1895 were nearly \$60,000; of the latter, about \$75,000. Both institutions were enlarged during 1896, the room for patients having proved very inadequate. The state prison, located at Trenton, had 977 inmates late in 1895, the cell-capacity having been at the time but 700. During the year, \$173,000 was disbursed, and the sum of \$52,702 received from the labor of the convicts. In 1895, \$100,000 was appropriated for a state reformatory, to be located at or near Rahway. During 1896 the same was in course of construction and will be occupied during 1897. The State Reform School for Boys, located at Jamesburg, has a farm of 490 acres. At the close of 1895 the number of inmates was 376, the cost of whose maintenance, over and above the proceeds of the farms, was, for the year 1895, \$60,106. The Industrial School for Girls, located near the city of Trenton, had, at the close of 1895, 119 inmates in the school, and 32 out at service, under indentures. The appropriation for 1895 amounted to \$20,116. The New Jersey Home for Disabled Soldiers is located at Kearny, in Hudson County. It has been in existence from 1865, and up to 1895 had afforded care and relief to 18,492 persons. At the close of 1895 the number of inmates was 497, the cost of maintenance for the year being \$30,000.

The National Guard of New Jersey in 1895 consisted of 325 officers and 3,613 enlisted men. This force was organized into sixty companies of infantry, two Gatling gun companies and two troops of cavalry. During the year, four companies of infantry, one Gatling gun company and one troop of cavalry had been organized. There were three companies of cadets attached to the National Guard, from which recruits are to be made for the guard as needed. A naval reserve, organized for the defense of the coasts and harbors of the state, was mustered into the service in 1895. The reserve was formed into two battalions of five divisions, the total number of officers was 23, and the petty officers and seamen numbered 245. (See NAVAL RESERVE, in these Supplements.) The ordinary expenses of the guard for 1895 were \$187,540. Counted under the head of extraordinary expenses was the cost of building an armory at Paterson and one at Jersey City, the former requiring \$139,590, and the latter \$75,295, making the total amount appropriated for the guard for the year \$402,426, in addition to which the Federal government contributed, in stores and munitions of war, the amount of \$16,171.

New Jersey had, in 1890, 2,085 church organizations, 2,204 edifices, a total church membership of 508,341, and church property of the value of \$29,490,414. The membership constituted 35.18 per cent of the entire population. There were 37 different denominations and 8 independent congregations. Of the denominations, the leaders, in point of numbers, of organizations were the Baptists, all bodies, 232; the Roman Catholics, 219, the Lutherans, all bodies, 68; the Methodists, all bodies, 727; the Presbyterians, all bodies, 307; the Protestant Episcopal, 186; and the Reformed, 142.

On Jan. 1, 1896, there were 369 newspapers published in New Jersey, of which 52 were daily, one tri-weekly, five semi-weekly, 279 weekly, three fortnightly, eight semi-monthly, and 21 monthly. Papers were published in all of the 21 counties and in 142 of the cities, towns and villages of the state. Of the last-named, 21 were county seats.

The following table shows the population of the cities and towns which had 8,000 inhabitants and over in 1890.

CITIES AND TOWNS.	POPULATION.		INCREASE.	PER CENT.
	1890.	1880.		
Atlantic City----	13,055	5,477	7,578	138.66
Bayonne-----	19,033	9,372	9,661	103.08
Bridgeton-----	11,424	8,722	2,700	30.98
Burlington-----	7,264	6,090	1,174	19.02
Camden-----	58,313	41,659	16,654	39.98
Elizabeth-----	37,764	28,229	9,535	33.78
Harrison-----	8,338	6,898	1,440	20.88
Hoboken-----	43,648	30,999	12,649	40.80
Jersey City-----	163,003	120,722	42,281	25.02
Millville-----	10,002	7,660	2,342	30.57
Morristown-----	8,156	5,418	2,738	50.51
Newark-----	181,830	136,508	45,322	33.20
New Brunswick---	18,603	17,163	1,440	8.37
Orange-----	18,844	13,207	5,637	42.68
Passaic-----	13,028	6,532	6,496	99.25
Paterson-----	78,347	51,021	27,326	53.53
Perth Amboy-----	9,512	4,808	4,704	97.84
Phillipsburg-----	8,644	7,181	1,463	20.37
Plainfield-----	11,267	8,125	3,142	38.67
Trenton-----	57,458	29,910	27,548	92.10
Union-----	10,643	5,849	4,794	81.96

Others of the thriving cities and towns of the state reported in 1890 populations as follows: Bordentown, 5,090; Northampton, 5,376; Montclair, 3,150; South Orange, 4,970; West Orange, 4,358; Princeton, 4,231; South Amboy, 4,330; Woodbridge, 4,665; Long Branch, 7,231; Raritan, 4,779; Salem City, 5,516.

The following is a list of the governors of New Jersey from 1776, with the date of their respective terms of office: William Livingston, 1776-90; William Patterson, 1790-94; Richard Howell, 1794-1801; Joseph Bloomfield, 1801-02; John Lambert, 1802-03; Joseph Bloomfield, 1803-12; Aaron Ogden, 1812-13; William S. Pennington, 1813-15; Mahlon Dickerson, 1815-17; Isaac H. Williamson, 1817-29; Peter D. Vroom, 1829-32; Samuel L. Southard, 1832-33; Elias P. Seeley, 1833; Peter D. Vroom, 1833-36; Philemon Dickerson, 1836-37; William Pennington, 1837-43; Daniel Haines, 1843-44; Charles C. Stratton, 1844; Daniel Haines, 1844-51; George F. Fort, 1851-54; Rodman M. Price, 1854-57; William A. Newall, 1857-60; Charles S. Olden, 1860-63; Joel Parker, 1863-66; Marcus L. Ward, 1866-69; Theodore F. Randolph, 1869-72; Joel Parker, 1872-75; Joseph D. Bedle, 1875-78; George B. McClellan, 1878-81; George C. Ludlow, 1881-84; Leon Abbett, 1884-87; Robert S. Green, 1887-90; Leon Abbett, 1890-93; George T. Werts, 1893-96; John W. Griggs, 1896.

NEW JERSEY, COLLEGE OF. See PRINCETON UNIVERSITY, in these Supplements.

NEW JERSEY TEA, a local name for *Ceanothus Americanus*, a shrubby plant belonging to the

Rhamnaceæ, or buckthorn family, with ovate and serrate leaves and umbel-like clusters of white flowers. The leaves were used for tea during the American Revolution.

NEW JERUSALEM CHURCH, popularly known as the Swedenborgian Church, is an organized body of Christians who base their faith upon the principles expounded by Emanuel Swedenborg (q.v., Vol. XXII, pp. 758-760). The first congregation founded in the United States was in 1792, at Baltimore. Since then the church has gradually spread, until in 1890 it was represented in 29 states and in the District of Columbia, having 154 church organizations and nearly 8,000 members. In 1896 the total membership in the United States had increased to 12,000.

Each individual church manages its own affairs. The various congregations are formed into state associations, and representatives of these associations, together with delegates from unassociated societies, form the General Convention. There are three orders in the ministry. First, the general pastors who have supervision of the associations; second, pastors of societies or ordained ministers; and third, preachers not yet in full orders. In 1890 there were 8 general pastors, 103 pastors and 10 authorized preachers. A theological school is maintained at Cambridge, Massachusetts, which has an endowment fund of about sixty thousand dollars.

The faith of the New Jerusalem Church is based upon the word of God as found in the Old and New Testaments, interpreted in a spiritual or symbolic sense. This spiritual interpretation was disclosed through Emanuel Swedenborg, in whose time occurred, it is claimed, the second advent and the last judgment foretold in the New Testament. The last judgment is described as having taken place in the spiritual world in the year 1757. It showed that "all which is foretold in the Book of Revelation is fulfilled." The second advent was a coming, not in the flesh, but in the opening of the internal and spiritual sense of His Holy Word, and hence the descending of the Holy City, the "New Jerusalem,"—the establishment of a new church of the New Jerusalem, and the beginning of the new or second dispensation of Christianity.

The New Church, the church of the prophecy, is said to be the fifth in point of historic sequence. The most ancient church was that described in Genesis under the name of Adam. This was a church of perception, having no need of verbal revelation. The second church came into being when men had lost their internal worship, while the external remained, giving rise to the mythological and idolatrous worship of the Egyptians, Assyrians, etc. The third church was the Israelitish, the fourth the Christian, established by the apostles and evangelists, and the fifth the New Jerusalem, which takes its name from *Revelation*.

According to the teachings of this church, there are two essentials to which every doctrine of the church has relation: the acknowledgment of the Lord, and a life according to the precepts of the Decalogue. There is no vicarious atonement; re-

demption came through the subduing of the evil spirits of darkness by the divinely assumed humanity of Jesus Christ. Salvation implies faith, repentance and obedience to the moral law. The New Church holds that the Godhead is a trinity, not of persons, but of principles, corresponding to the soul, the body and the operative energy in man. It believes that all infants and children, and all who strive to live a good life in accordance with their religion, will be saved. It denies the resurrection of the material body, holding that the soul has a spiritual body of its own. It believes in the plenary inspiration of the Holy Scriptures, whereby they contain an internal sense, which is the Word of God. It teaches that heaven and hell exist in this world, as states of the soul, and are perpetuated in the spiritual world. Its interpretation of the Scriptures is based upon the "science of correspondences," or the analogy which exists between spiritual and natural things.

The New Church has a publishing house in Philadelphia. Among its periodicals are *The New Jerusalem Messenger*, New York; *The New Church Review*, Boston; and *The New Church Life*, Philadelphia. The educational institutions of the Church are Urbana University, Urbana, Ohio; Waltham Academy, Waltham, Massachusetts; The Academy Theological Seminary, Philadelphia, Pennsylvania; and The Convention Theological School, Cambridge, Massachusetts.

Authorities. Correspondences of the Bible, 2 vols., John Worcester; *The Science of Correspondences Elucidated*, by Edward Madeley; *Light on Current Topics*, Bennett Lectures for 1895; and the works of Emanuel Swedenborg, all issued from the publication houses of the New Church, at Philadelphia and Boston.

NEW KENSINGTON, a borough of Westmoreland County, southeastern Pennsylvania, 18 miles N.E. of Pittsburg, on the Allegheny River, and on the Allegheny Valley railroad; has several glass-works, foundry and machine-shops, and cold-rolled steel, stone and white-lead works; also a bank. Population 1890, 6,500.

NEW LEBANON, a town in Columbia County, New York, on the Lebanon Springs railroad, 22 miles S.E. of Albany. It comprises the village of Mount Lebanon, seat of a Shaker community, and Lebanon Springs, a place of resort for its thermal waters, which have a temperature of 77° F. Population 1890, 1,800.

NEW LEXINGTON, a village of Perry County, southeastern Ohio, 21 miles S.W. of Zanesville and 53 miles S. of Columbus, on the Ohio Central and the Cincinnati and Muskegon Valley railroads; is surrounded by hills which contain abundance of coal; has six churches, a pottery and a planing-mill. Population 1890, 1,470.

NEW LISBON, a village and the capital of Columbiana County, eastern Ohio, 33 miles S. of Warren, on the New York, Lake Erie and Western and the Pittsburg, Marion and Chicago railroads, and on Little Beaver River, in an agricultural, iron, coal and wool-growing region. It has manufactories of sewer-pipe, woolen goods and fire-brick. Population 1890, 2,278.

NEW LONDON, a city and one of the capitals of New London County, Connecticut. It has

now 12 churches; the Williams Memorial Institute, for girls; the Bulkeley High School, for boys; the Haven Public Library Building; the New London County Historical Society, containing a very valuable library; three national, one state and two savings banks. The city is well lighted with electricity and contains four shipyards. The river here is a favorite racing-course for colleges. Population 1890, 13,757. See also NEW LONDON, Vol. XVII, p. 399.

NEW LONDON, a city of Waupaca County, central eastern Wisconsin, 28 miles N.W. of Oshkosh, at the confluence of the Wolf and the Embarrass rivers, and on the Chicago and North-Western and the Green Bay, Winona and St. Paul railroads. It has a graded school, five churches and manufactures of lumber and staves; is known throughout the state for the purity of its water. Population 1890, 1,882; 1895, 1,972.

NEW MADRID, a village and the capital of New Madrid County, southeastern Missouri, about 40 miles S.W. of Cairo, Illinois, on the Mississippi River; the shipping-point of a grain, cotton and stock raising district; also has several cotton-gins. Population 1890, 1,193.

NEWMAN, EDWARD, an English naturalist; born in Hampstead, May 13, 1801. He was a printer in London, but devoted much of his time to the study of natural history. In 1833 he founded the *Entomological Magazine*, which was merged in the *Entomologist* in 1840. In 1843 he established the *Zoologist*. His publications include *History of British Ferns* (1840); *Dictionary of British Birds* (1866); *Illustrated Natural History of British Moths* (1869); *Illustrated Natural History of British Butterflies* (1871). He died June 12, 1876.

NEWMAN, FRANCIS WILLIAM, an English educator and author, was born June 27, 1805, in London; brother of Cardinal Newman; educated at Ealing and at Worcester College, Oxford, taking double first class in 1826; fellow of Balliol from 1826 to 1830; resigned on account of scruples concerning infant baptism; abandoned a mission to Mesopotamia because of increasing skepticism; tutor of classics in Bristol College (1833-40); professor of classics at Manchester New College (1840-49); professor of Latin at University College, London (1846-63). Professor Newman was a versatile linguist, and, besides the classics, devoted much study to Semitic and North African tongues, writing treatises upon them and upon mathematics. He published *Libyan*, modern Arabic and Kabail lexicons; works on Horace, Homer, Æschylus and *The Politics of Aristotle*; a Latin translation of *Hiawatha*; *Catholic Union* (1844); *A Reply to the Eclipse of Faith* (1853); *Theism, Doctrinal and Practical* (1858); *The Moral Influence of Law* (1860); *The Soul: Its Sorrows and Aspirations* (1863); *History of the Hebrew Monarchy* (1865); *Phases of Faith* (1865); *Religion not History* (1877); *A Christian Commonwealth* (1883); *Life After Death* (1886); *Reminiscences of Two Exiles and Two Wars* (1888), relating to Kossuth and Pulaski and the Crimean and Sardinian wars; four volumes of *Miscellanies*, being a collection of essays on a wide range of subjects; and a memoir of the *Early History of Cardinal Newman* (1891).

NEWMAN, JOHN HENRY, CARDINAL, a leader of the Oxford Tractarian movement of 1833 in the Church of England; was born in London, Feb. 21, 1801. He took his degree at Oxford in 1820, when he was only 19. In 1821 he wrote, jointly, with a friend, two cantos of a poem on *St. Bartholomew's Eve*. In 1822 he was elected to a fellowship in Oriel College, and it was here that he formed his close intimacy with Dr. Pusey, and subsequently with Hurrell Froude, brother of the historian, who had a great share in originating the Tractarian movement. Here, also, he formed cordial relations with Dr. Hawkins, afterward the provost of the college, and Whately, subsequently archbishop of Dublin. Both of them exercised great influence over him by teaching him to define his thoughts clearly. Newman's first book was that on the *Arians of the Fourth Century*. It was a scholarly production, intended to show that the Arian heresy was not of Alexandrian origin, but was one of the Judaizing heresies which sprang up in Antioch. In 1832 Newman, then in delicate health, accompanied Hurrell Froude in a Mediterranean tour, and it was then that the fire kindled which was to bear fruit in the Anglican movement of 1833, the aim of which was to seek a basis for clerical authority independent of the state, with perhaps a vision of restoring the Church of England to Catholicism. Most of Newman's smaller poems were written on this voyage, and were published in *Lyra Apostolica*, a volume of verse, the object of which was to reassert for the Church of England her spiritual authority and mission. It was on this tour that Newman met Cardinal Wiseman, and told him, in reply to the expression of a courteous wish that Hurrell Froude and he might visit Rome, "We have a work to do in England." At Rome, Newman left his friends to go alone to Sicily, where he fell ill of malarial fever. His mind was deeply possessed during his illness by spiritual things. Becalmed in the Straits of Bonifacio, he wrote the best-known of all his poems, "*Lead, Kindly Light*" (see *HYMNS*, Vol. XII, p. 595). From Marseilles he proceeded to England, reaching home in time to be present at Keble's Oxford assize sermon on *National Apostasy*, which he always regarded as the date at which the Tractarian movement began. Into the series of *Tracts for the Times* Newman threw himself with great energy, actuated by a Catholic theory of the English Church which had taken root in his imagination. In 1837, in a course of lectures, he made an attempt to distinguish the Anglican *via media* from the doctrines of the Church of Rome.



CARDINAL NEWMAN.

The famous *Tract 90*, which came from Newman's pen, brought on an explosion which was the end of the Tractarian movement, and hastened many conversions to Rome. Newman struggled for two years longer to think his position tenable, but in 1843 re-

signed the vicarage of St. Mary's, and withdrew from the English Church. In October, 1845, he was received into the Roman Catholic Church, and then went to Rome for a year and a half. On his return in 1848, he published *Loss and Gain*, the story of an Oxford conversion very different from his own, but full of happy and delicate sketches of Oxford life and manners. Shortly afterward he produced *Callista*, the story of a martyr in Africa of the third century.

In 1849 Newman established a branch of the Brotherhood of St. Philip Neri in England, and retired to a suburb of Birmingham, where he did a great deal of hard work, devoting himself to the sufferers from cholera in 1849 with the utmost zeal. The lectures on *Anglican Difficulties*, intended to show that Tractarian principles could only issue in submission to Rome, was the first book which drew public attention to Newman's great power of irony and the singular delicacy of his literary style. These lectures were followed by the lectures on *Catholicism in England*, which gave occasion to Dr. Achilli's action for libel against him. In 1864 a casual remark by Canon Kingsley led to a correspondence which resulted in the publication of the remarkable *Apologia pro Vita Sua*, the most fresh and effective religious autobiography of the nineteenth century, and perhaps the most fascinating of his many works, as it is the most personal. In 1865 he wrote *The Dream of Gerontius*, a poem of marvelous subtlety and pathos. In 1870 he published his *Grammar of Assent*, a book on the philosophy of faith. His other writings, besides a work on the *Development of Christian Doctrines*, are chiefly a voluminous series of sermons which are full of the charm of his sweet disposition. In the controversies which led to the Vatican Council, Newman sided with the Inopportunists. He was at this time in vehement opposition to the Ultramontanes, and nothing seemed less likely than that Newman should ever become a cardinal, but after the death of Pio Nono, and the election of Leo XIII, the policy of the church altered, and the new Pope was anxious to show his sympathy with the English Catholic moderates, of whom Dr. Newman was much the most distinguished. Accordingly, in 1879, Newman was summoned to Rome to receive the cardinal's hat. For the last eleven years of his life Cardinal Newman, who now lived at his Edgebaston oratory, seldom broke silence. He was a man "of the highest moral and spiritual aspirations, of rare intellectual gifts, of fine sensibilities, and of exquisite culture." He died at Edgebaston, near Birmingham, Aug. 11, 1890.

NEWMAN, JOHN P., an American Methodist Episcopal bishop; born in New York City, Sept. 1, 1826, and entered the ministry in 1849. He went to Europe in 1859, and on his return published *From Dan to Beersheba*. In 1869 he became pastor of the Metropolitan Church in Washington, and was chaplain of the Senate for three years. In 1873 he made a tour of the world under appointment of President Grant, and wrote *Thrones and Palaces of Babylon and Nineveh*. He was elected bishop in 1888.

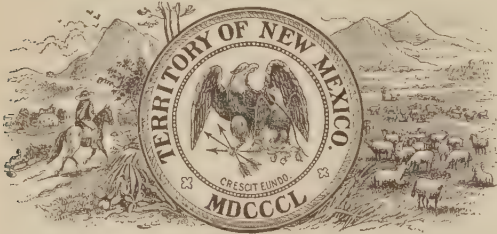
NEWMARKET, a town of Rockingham County,

southeastern New Hampshire, nine miles E. of Portsmouth, on the Boston and Maine railroad. It has a library, and is principally engaged in the manufacture of cotton goods. Population 1890, 2,742.

NEWMARKET, a village of York County, central southern Ontario, Canada, 35 miles N. of Toronto, on the Grand Trunk railroad; has important manufactures and trade. Population 1891, 2,143.

NEW MECKLENBURG OR NEW IRELAND, an island of the Bismarck Archipelago, northeast of New Guinea, and the second largest of a group of which New Pomerania, or New Britain, is the largest, and from which it is separated by St. George's Channel. The island lies northwest and southeast, having a length of about 200 miles and a width of from 20 to 30 miles. The surface is mountainous, and attempts at colonization have met with little success. The island received its present name when it came under German protection in 1884. See also NEW BRITAIN, Vol. XVII, p. 372.

NEW MEXICO had a population, in 1890, of 153,593,—a gain of 34,028 during the ten years pre-



SEAL OF THE TERRITORY OF NEW MEXICO.

ceding,—an increase of 28.46 per cent. Its rank in 1890 was forty-third, that of 1880 having been forty-first. The density of population at the last-named period was 1.25 to the square mile; at the former period, .98 to the square mile. The population was made up, in 1890, of 83,055 males and 70,538 females; the percentage of native-born population was 92.67; the number of negroes was 1,956,—an increase of 941 since 1880; the Indians numbered 8,554; there were 361 Chinese and 3 Japanese. The latest corrected surveys of the territory show the area to be 122,580 square miles, of which 120 square miles are water surface, leaving the land surface 122,460 square miles, 78,374,400 acres. This gives New Mexico the rank of fourth in the matter of area, only Texas, California and Montana, in the order named, exceeding it in size.

In 1889 the total area devoted to the cereals was 61,340 acres, of which 46.53 per cent was under corn, 35.63 per cent under wheat, 15.18 per cent under oats, 2.42 under barley, .11 under rye and .13 under buckwheat; 28,539 acres under corn yielded 583,489 bushels; 21,853 acres under wheat yielded 343,484 bushels; 9,314 acres under oats yielded 193,832 bushels; 1,484 acres under barley yielded 35,024 bushels; 69 acres under rye yielded 810 bushels; and 81 acres under buckwheat yielded 744 bushels. In the Western division of states, 10,746 asses were reported on farms in 1890, 5,958, or 55.44 per cent, of which were found in New Mex-

ico. Cattle on farms numbered less than ten to the square mile, sheep were decreased in number 1,464,337 according to the count of 1880, and the annual supply of milk was five gallons *per capita*. The total number of farms in 1890 was 4,458,—a decrease of about 600 since 1880; the total acreage was 787,882,—an increase of about 150,000 acres since 1880; the improved land in farms was 263,106 acres,—an increase of about 25,000 acres in the period mentioned; and the unimproved land in farms was increased about 130,000 acres. The total value of lands, fences, buildings, farm implements and farm stock was given in the last census, at \$15,679,120, the census of 1880 giving the value at \$10,780,361. The following is the showing, as to farm stock and products, for the two years, 1880 and 1890:

	1880.	1890.
Horses	14,547	38,130
Mules and asses	9,063	8,367
Neat cattle	166,701	577,511
Milch cows (included above)	12,955	18,507
Swine	7,857	10,471
Sheep, not including spring lambs	2,880,831	1,248,970
Pounds of wool clipped	4,019,188	4,074,503
Gallons of milk produced	10,036 (a)	717,155
Pounds of butter	44,827	86,042
Pounds of cheese	10,501	18,931
Tons of hay harvested	11,025	47,253
Acres of meadow mown	12,351	26,375
Bushels of Irish potatoes	21,883	35,999
Bushels of sweet potatoes	3,217	5,351

The soil and climate of New Mexico are both favorable to many agricultural products that have not been extensively grown. Up to 1896 fully 90 per cent of the butter, eggs and poultry used in the territory was brought from other states, while the conditions for both dairying and the raising of poultry could scarcely be excelled. Up to the same date not a broom had been made in New Mexico. Every condition is favorable for the propagation of the corn, and the long dry seasons very advantageous for curing. Alfalfa produces as much as four tons to the acre, and the product, when cured, as well as when green, is excellent food for hogs; still, all of the hog products placed on sale were, as late as 1895, imported. Fruit flourishes in New Mexico, especially in the Rio Grande valley, south of Albuquerque, where the vineyards produce grapes as large and luscious as those grown in France, and the pears and peaches rival those of California. Under irrigation, apples, peaches, nectarines, pears and many of the small fruits thrive and yield abundantly. Much of the land in New Mexico is arid from lack of sufficient rainfall. Irrigation brings bounteous crops, and much capital has been invested in constructing dams, ditches and canals, thus reclaiming vast areas. (See IRRIGATION, in these Supplements.)

In 1890, New Mexico had 127 specified manufacturing industries, in which \$965,938 was invested as capital, 944 persons being employed, to whom \$532,727 were paid as wages, and products turned out to the value of \$1,516,195. The principal industry was lumber and other mill products, which returned \$389,761. Flouring and grist mill products

aggregated \$307,805, and cars and general shop construction amounted to \$354,066.

Many minerals and varieties of precious stones are found in New Mexico. The production of minerals has decreased somewhat from the census figures, which placed the value of the output of 1889 at \$4,611,764, of which \$815,655 was from gold and \$1,251,124 from silver. For 1893 the gold produced was of the value of \$1,250,000, the silver being a little in excess. In 1894 these values were both decreased, but in 1895 they were again at about the same point as in 1893. Large amounts of capital are invested in the gold and silver mines, and estimates of the possible annual product reach as high as \$20,000,000. The copper produced in 1889 amounted to \$3,686,137 pounds; lead and zinc amounted to 13,733 tons of base bullion of the former and 140 tons of the latter. Coal, both anthracite and bituminous, is found in abundance in many parts of the territory, the amount mined for shipment in 1895 reaching nearly 1,000,000 tons. Iron ore of superior quality is abundant and in close proximity to the best coal; salt is found in great quantities; gypsum in several places; carbonate and sulphate of soda exist in exhaustless bodies; alum in an almost pure state has been discovered and worked to some extent; while all of the best varieties of stone, as well as marbles of great beauty, exist in deposits of great extent; and kaolin and other valuable clays have been found in many parts of the territory. The precious stones consist of emeralds, turquoises, garnets, opals, agates and petrified woods crystallized so as to be suitable for jewelry. Turquoises have been found of the value of \$4,000 for a single gem.

From one silver-mine in Sierra County \$6,500,000 was taken from 1880 to 1895, and at Lake Valley over \$3,500,000 was taken from a single pocket. During the 15 years mentioned above, the output of gold, silver, lead and copper from the city of Socorro was valued at \$58,000,000.

The thermal springs of New Mexico are excelled only by those of the famous Yellowstone National Park. Those at Folsom, in Colfax County, are close to the extinct volcano of Capulin, at an altitude of 6,500 feet above the sea. The Las Vegas Hot Springs, in San Miguel County, are perhaps the best known of the many in the territory, by reason of their curative virtues. They are 22 in number, and the water very much resembles that of the famous hot springs of Teplitz, in Austria. The temperature of the different springs varies from 80° to 140°. In the midst of the location occupied by the ancient Cliff-Dwellers, 6,000 feet above the sea, are the Ojo Caliente (Hot Springs), about 50 miles north of Santa Fé. Their temperature ranges from 90° to 122°, and their gases are carbonic. Other hot springs of prominence are James Hot Springs, in Bernalillo County, which include a geyser with an opening one foot square; the Cherryville Springs, altitude 6,540 feet and temperature 130°; the Apache Tajoe Springs, in Grant County, four miles from White Water; and Hudson Springs, at an altitude of 5,782 feet, average temperature 130°, three miles from Hudson, on the Santa Fé railroad. The Aztec Springs, four miles east of Santa Fé, are cold water,

with 18 grains of solid material to the gallon, the water very much resembling the most celebrated of the German springs.

During the Congressional term of 1874-75 both Houses of Congress adopted a bill providing for the admission of New Mexico as a state, but the House not agreeing to amendments made to the bill by the Senate, the act was not passed. Again, in 1894, an enabling act was passed, which, after prescribing various provisions for the state constitution, appropriated 9,910,000 acres of the public domain for colleges, water-reservoirs, asylums, normal schools, schools of mines, reform school and miscellaneous purposes. No action had been taken on this act up to 1896.

There were about 1,600 miles of railway lines in New Mexico in 1896. Very little construction progressed from 1890 up to the date given. The Atchison, Topeka and Santa Fé is the main line of road in the territory.

The report of the public schools of the territory made in 1895 is incomplete. The report of the preceding year shows the number of school districts to be 553; the number of teachers, 572; the number of persons between 5 and 20 years (the school age), 45,389; the number of pupils enrolled, 22,605; the average daily attendance, 15,736; the average number of months of school, 4; the total receipts for school purposes, \$192,496; the total amount expended, \$188,937. The leading institution of higher education is the University of New Mexico, located at Albuquerque (q.v., in these Supplements). Other institutions are the Agricultural College, at Las Cruces; the Military Institute, at Roswell; two normal schools, one at Silver City and one at Las Vegas; the School of Mines, at Socorro; the Institution for the Deaf, Dumb and Blind, at Santa Fé; and the Indian Industrial Schools, at Santa Fé. There are several private and religious educational institutions in the territory. The Methodist Episcopal Church has 8 schools, with 12 teachers, 300 pupils, school property valued at \$15,000 and a library of 620 volumes. The Presbyterian Church maintains 28 day and boarding schools, employs 50 teachers, has 1,615 pupils enrolled; their school buildings are valued at \$52,750; the salaries paid amount to \$25,000 annually, and other expenses connected with the work amount to nearly \$10,000. The St. Vincent Hospital and the St. Vincent Territorial Orphans' Home and Industrial School, although territorial institutions, are under the control of the Sisters of Charity. For the former the legislature appropriates \$6,000, and for the latter, which is for girls only, \$5,000 annually. The Catholic Church also controls several other schools throughout the territory, and there are also a number of mission schools sustained by the Methodist Episcopal Church.

The Insane Asylum, located at Las Vegas, having proven inadequate for the number of patients applying for admission, the legislature, in 1895, made an appropriation of \$35,000 for enlarging the same. June 30, 1895, there were confined in the penitentiary 191 prisoners, the cost of whose maintenance for the preceding year had amounted to 38.84 cents per

day per man, which sum included salaries for all officers, employees, commissioners, medical attendance, etc., as well as subsistence and clothing. The territory sustains four charitable hospitals, one at Santa Fé, one at Las Vegas and two at Silver City, where indigent persons are supported at the expense of the public.

In 1895, taxes were levied on property of the total equalized value of \$39,090,501. The total amount of taxes levied was \$304,636, for the following purposes: For territorial expenses, \$233,683; for casual deficit, bond interest, \$10,288; for territorial institutions, \$58,435; for cattle indemnity, \$2,227.

The National Guard of the territory of New Mexico consists of five companies of infantry and three troops of cavalry. One of the latter consisted of La Guna Indians, officered by Americans, and had made an enviable record against the renegade Indians, headed by Victorio and Geronimo. The membership of the other companies consisted largely of frontiersmen who have served the territory whenever their services have been required. No appropriation had ever been made up to 1896 for the support and maintenance of the National Guard, and in the campaigns in which many of the companies have been engaged, some of which lasted for periods of upward of four months, they furnished their own horses and had subsistence supplied by the citizens.

In 1890 there were, in New Mexico, 463 church organizations, 381 edifices, a membership of 105,749, which constituted 68.85 per cent of the population, and church property of the value of \$531,925. There were 12 different denominations, the most prominent, in point of numbers, being the Regular Baptists, North, 15 organizations (the only Baptists in the territory); Roman Catholics, 317 organizations; all Methodists, 60; all Presbyterians, 39; and Protestant Episcopal, 16.

On Jan. 1, 1896, there were 57 newspapers published in the territory, of which 5 were daily, 1 tri-weekly, 47 weekly, 1 semimonthly and 3 monthly. Papers were published in 16 of the 18 counties and in 29 of the cities, towns and villages, of which 14 were county seats.

The principal cities and towns of New Mexico, with their populations as given in the census of 1890, are given herewith: Santa Fé, 6,185; Albuquerque (new), 3,785; Las Vegas, 2,385; Silver City, 2,102; Albuquerque (old), 1,733; Socorro, 1,601; Raton, 1,255; and Deming, 1,136.

The following is a list of the governors of New Mexico since the organization of the territory, with their respective terms of office: James S. Calhoun, 1851-52; William C. Lane, 1852-53; Solon Borland, 1853; David Merriwether, 1853-57; Abraham Rencher, 1857-61; Henry Conolly, 1861-65; Robert B. Mitchell, 1865-67; W. F. M. Army (acting), 1867-69; William A. Pile, 1869-71; Marsh Giddings, 1871-76; Samuel B. Axtel, 1876-78; Lewis Wallace, 1878-81; Lionel A. Sheldon, 1881-85; Edmund G. Ross, 1885-89; L. Bradford Prince, 1889-93; W. T. Thornton, 1893-97; Miguel A. Otero, 1897. See also NEW MEXICO, Vol. XVII, pp. 399-402.

NEW MEXICO, UNIVERSITY OF, a state institu-

tion of learning at Albuquerque, provided for by an act of the legislature of 1888-89, and organized in 1892. It is equipped and supported by territorial appropriations. It is expected that when New Mexico receives statehood the institution will receive a liberal grant of public lands, as has been the practice in regard to similar institutions in other states. Owing to the sparse population, the board of regents found it advisable to receive students many of whom properly belong in high schools, thus repeating the history and experience of other youthful institutions. There is attached to the university a preparatory school of a two years' course, from which scholars can proceed to the university itself. There are eight instructors, and there were 93 students in 1895.

NEW MILFORD, a village of Litchfield County, western Connecticut, 21 miles S.E. of Litchfield, on the Shipang, Litchfield and Northern railroad; has a library and is the center of the tobacco industry of the Housatonic Valley; has two hat factories, a pottery, and other smaller industries. Population 1890, 3,917.

NEWNAN, a city and the capital of Coweta County, western Georgia, 36 miles S.W. of Atlanta, on the Central of Georgia railroad; has two national banks, and Walker High School, College Temple Library; manufactures harness, furniture and cigars; has large fruit interests in the vicinity. Population 1890, 2,859.

NEW NETHERLANDS, THE FOUNDING OF. See UNITED STATES, Vol. XXIII, p. 730.

NEWNHAM COLLEGE, an English institution for the higher education of women, located at Cambridge, England; founded in 1871, when the Newnham Hall Company opened a house for five resident women students. Old Hall, Sidgwick Hall and Clough Hall now form Newnham College, where, in 1895, over one hundred and fifty students, under the charge of a principal, two vice-principals and eleven resident tutors, received instruction both by lectures delivered at Newnham, and by such lectures of the university and colleges of the university as were open to them. In 1881 the University of Cambridge opened to students of Newnham and Girton its tripos and previous examinations, and in 1889, out of thirty-five students of Newnham who entered for the tripos examination, six took a first-class, sixteen a second-class and nine a third-class; while in 1890 Miss Fawcett was placed above the senior wrangler. The institution is maintained by the fees received from students and by the gifts of the Association for the Promotion of the Higher Education of Women.

NEW ORLEANS, the chief city of Louisiana. Jan. 1, 1890, the municipal debt aggregated \$17,009,209.82. The real and personal property of the city was listed at \$122,000,000 and the rate of taxation fixed at 20 mills per \$100.

The principal manufacturing industries, as reported by the United States census of 1890, show the following figures. These are the figures as given in the comptroller's report for 1893. The total assessment valuation includes both real and personal property:

PRINCIPAL MANUFACTURING INDUSTRIES.	NO. OF ESTABLISHMENTS REPORTING.	AGGREGATE CAPITAL INVESTED.	WAGES PAID.	TOTAL VALUE OF PRODUCTS.	AVERAGE NUMBER OF EMPLOYEES.
Carriages and wagons, including custom work and repairing--	41	\$ 210,853	\$158,081	\$ 346,494	292
Clothing, men's, factory products	26	1,169,927	612,421	2,174,747	3,686
Cooperage-----	71	381,451	299,333	810,611	665
Cotton, cleaning and rehandling--	7	25,500	26,750	51,500	124
Cotton, compressing-----	14	1,528,000	652,135	981,552	1,086
Cotton, ginning--	3	9,400	5,547	50,154	26
Foundry and machine-shop products-----	34	1,508,189	721,879	1,972,856	1,077
Furniture, factory products-----	5	103,310	47,754	144,157	95
Liquors, malt-----	8	3,188,232	270,884	1,905,760	282
Lumber and other mill products from log or bolt	10	1,077,430	278,924	1,406,177	598
Lumber, planing-mill products, including sash, doors and blinds	17	840,675	372,030	1,093,451	577
Rice, cleaning and polishing-----	14	970,400	162,950	3,577,885	363
Sugar and molasses refining----	7	1,302,300	328,772	11,737,323	792
Tobacco, chewing, smoking and snuff-----	5	115,238	58,451	282,080	171
Tobacco, cigars and cigarettes--	77	379,302	753,578	1,569,145	1,942

As a shipping-point, New Orleans stands as one of the most important in the country. The following statistics from the United States census of 1890 will show some of the most important facts in regard to the city's traffic by water.

Tons of freight moved and miles covered by the passenger and freight-carrying vessels, exclusive of ferry-boats:

COAL.	LUMBER.	STONE.	ICE.
3,580	415,128	1,974	299

CEMENT, BRICK AND LIME.	ALL OTHER COMMODITIES.	TOTAL.	MILES COVERED.
12,955	467,689	901,625	821,236

Summary showing the amount of freight moved and miles traveled by the passenger and freight-carrying vessels in the various traffic districts: Tons of freight moved, 1,144,754; number of miles traveled, 1,288,267.

Equipment, occupation and construction; equipment of fleets in general:

TOTAL OF ALL CRAFTS.			STEAMERS.		
Numb'r.	Tonnage.	Valuation.	Numb'r.	Tonnage.	Valuation.
283	36,304	\$1,910,060	56	31,407	\$1,712,700

SAILING-VESSELS.			UNRIGGED CRAFTS.		
Numb'r.	Tonnage.	Valuation.	Numb'r.	Tonnage.	Valuation.
214	4,247	\$194,360	13	650	\$300

Financial account in general; gross earnings, expenses and net earnings of the passenger and freight-carrying vessels, exclusive of ferry-boats:

TOTAL.			STEAMERS.		
Gross Earnings.	Expenses.	Net Earnings.	Gross Earnings.	Expenses.	Net Earnings.
\$1,943,309	\$1,439,731	\$503,578	\$1,685,854	\$1,231,311	\$454,543

SAILING-VESSELS.			UNRIGGED CRAFTS.		
Gross Earnings.	Expenses.	Net Earnings.	Gross Earnings.	Expenses.	Net Earnings.
\$254,655	\$206,420	\$48,235	\$2,800	\$2,000	\$800

Employees' wages; total wages paid during the year to employees making ordinary crews of the passenger and freight-carrying vessels, exclusive of ferry-boats:

ALL CRAFTS.		STEAMERS.	
Number Making Ordinary Crews.	Wages Paid During Year.	Number Making Ordinary Crews.	Wages Paid During Year.
1,041	\$303,456	500	\$172,796

SAILING-VESSELS.		UNRIGGED CRAFTS.	
Number Making Ordinary Crews.	Wages Paid During Year.	Number Making Ordinary Crews.	Wages Paid During Year.
538	\$129,220	3	\$1,440

The most notable building of New Orleans is the United States custom-house, the largest public building in the United States excepting the capitol and treasury buildings at Washington, built of Quincy (Massachusetts) marble; next is the city hall, on St. Charles Street, built of white marble; then come the Tusco-Doric court-houses, on Jackson Square; the Roman Catholic Cathedral of St. Louis; the Merchants' Exchange, built of marble; the Masonic and Odd Fellows' halls; St. Patrick's hall, with a seating-capacity of three thousand five hundred; the Hotel Royal; Exposition hall; Mechanics' Institute; Sugar and Produce exchanges; new Cotton Exchange; Howard Memorial Library, erected by Miss Annie Howard in memory of her father; Sophie Newcomb Memorial College; Charity Hospital; United States Marine Hospital; the Hotel Dieu; French opera-house; Academy of Music; National, Varieties and St. Charles theaters, and the French market.

The following railroads run into New Orleans: The Illinois Central; the Louisville and Nashville; the New Orleans, Fort Jackson and Grand Isle; the New Orleans and North Eastern; the New Orleans and Southern; and the Southern Pacific.

In 1890 there were 180 churches, including almost every denomination: 55 Baptist, 31 Roman Catholic, 11 Methodist Episcopal, 11 Lutheran, 6 Evangelical Protestant, 5 Congregational, 5 Hebrew, 1 Unitarian, 1 Christian, 1 Greek.

The census of 1890 showed 54 grammar-schools and 3 high-schools, besides numerous private colleges, schools and academies; the Tulane University (q.v., in these Supplements); New Orleans University; the Jesuit College; the Southern University, a state institution; the Leland University; and the Straight University (q.v., in these Supplements), which is exclusively for colored students.

There are six lines of street-railways, amounting in distance to about one hundred and fifteen miles.

New Orleans has 8 daily papers, 28 weekly, 3 semi-weekly, 5 monthly and 2 semimonthly. Population 1890, 242,099. See NEW ORLEANS, Vol. XVII, p. 402.

NEW ORLEANS, BATTLE OF, occurred Jan. 8, 1815, at New Orleans, Louisiana, between the troops of Great Britain under General Pakenham and the United States troops under General Andrew Jackson. The British forces had been concentrating at Lake Borgne, near New Orleans, preparatory to an attack upon the city. Their movements were watched closely by Jackson, and, as they began the march toward the city in December, 1814, he advanced to meet them on a plain called Chalmette, five miles from the city. There, Dec. 23d, 28th and Jan. 1st, sharp engagements took place, in which Jackson was victorious. Pakenham was reinforced, and Jan. 8, 1815, with 10,000 men attacked the fortifications of the city, manned by only 5,000 men. Jackson had valuable assistance from the gunboat *Louisiana*, which bombarded the British camp. The British made a fierce attack upon the breastworks, but were met by such a musketry-fire that they fell back in great disorder. The three British generals were wounded severely, one of them mortally. The loss to the Americans was 8 killed and 13 wounded; to the British, 700 killed, 1,400 wounded and 500 taken prisoners.

NEW PHILADELPHIA, a village and the capital of Tuscarawas County, eastern central Ohio, 20 miles S.E. of Carrollton, on the Cleveland and Pittsburgh railroad; it is in a salt, coal and iron-ore region, and has manufactories of sheet and muck iron, agricultural implements, woolen goods, roofing-tile, wire nails, cast-iron pipes, machinery, flour, paper, carriages and brooms. Population 1890, 4,456.

NEWPORT, a village of Jackson County, central northeastern Arkansas, 32 miles E. of Harrisburg, on the White and Black River Valley railroad; has saw, shingle and planing mills; stair, oil and stave works; also foundries and machine-shops. Population (estimated) 1890, 3,000.

NEWPORT, a city and the capital of Campbell County, northeastern Kentucky, on the Ohio River, opposite Cincinnati, on the Chesapeake and Ohio and the Louisville and Nashville railroads; an iron railroad bridge connects Newport with Cincinnati; the city is pleasantly situated, and contains many handsome residences built by Cincinnatians; has a

public library, and its industries include the manufacture of nuts and bolts, iron and steel, stoves, watch-cases, and piping. Population 1890, 24,918.

NEWPORT, a town and the capital of Sullivan County, central western New Hampshire, 33 miles W.N.W. of Concord, on the Sugar River and on the Boston and Maine railroad; contains the Anti-quarian Building, the Richards Free Library, and has manufactories of flannel goods, ladies' underwear, woolen goods, boots and shoes, and lumber. It is a well-known summer resort, and is within five miles of the late Austin Corbin's famous place called Blue Mountain Park. Population 1890, 2,623.

NEWPORT, a borough of Perry County, eastern central Pennsylvania, 6 miles N.E. of New Bloomfield and 28 miles N.W. of Harrisburg, on the Juniata River, the Pennsylvania Canal, and the Pennsylvania and the Newport and Sherman Valley railroads; is in an agricultural region, and has a tannery, a planing-mill, a furnace, foundry, pottery, and glue factory. Population 1890, 1,417.

NEWPORT, a city of Rhode Island. The city has for many years past been the most fashionable summer resort in America. Some of the summer residences built here of recent years have not their equal in the world. On Coaster's Harbor Island is the United States Naval War College, established in 1884 and consolidated with the torpedo station in 1889 and with the naval training-school in 1894. The census reports of 1893 show the assessed valuation of real estate, \$27,757,000; personal, \$7,096,800. Population 1890, 19,457. See also NEWPORT, Vol. XVII, p. 406.

NEWPORT, a town of Orleans County, northern Vermont, 38 miles N.N.W. of St. Johnsbury, on the Bennington and Rutland and the Boston and Maine railroads, and on Lake Memphremagog; is in an agricultural region, and is a popular summer resort. Population 1890, 3,047.

NEWPORT NEWS, a town, port of entry and the capital of Warwick County, southeastern Virginia, 14 miles N. of Norfolk and 70 miles S.E. of Richmond, on the Chesapeake and Ohio railroad; has extensive wharves and large elevators, and is said to be one of the best harbors in the world. It is connected with Hampton and Old Point Comfort by an electric railway; has an extensive ship-building plant, and a direct line of freight-steamers to England. It is the fourth largest grain-shipping port in the United States, and is in a rich peanut-growing country. Population 1890, 4,449.

NEW PROVIDENCE. See BAHAMAS, Vol. III, p. 236.

NEW RED SANDSTONE. See GEOLOGY, Vol. X, p. 351.

NEW RICHMOND, a village of Clermont County, southwestern Ohio, 11 miles S.W. of Batavia, on the Cincinnati, Georgetown and Portsmouth railroad; has woolen-mills, brick and furniture works, flour-mills and other industries. Population 1890, 2,379.

NEW RICHMOND, a village of St. Croix County, eastern Wisconsin, 15 miles N.E. of Hudson and 90 miles E.N.E. of Eau Claire, on Willow River, and on the Chicago, St. Paul, Minneapolis and Omaha rail-

road. It has water-power, running a large flour-mill. Pine and hardwood timber is abundant in the district, and pine lumber is largely manufactured here. Population 1890, 2,379.

NEW ROCHELLE, a village of Westchester County, southeastern New York, on Long Island Sound, 18 miles from New York, on the New York, New Haven and Hartford railroad. It is a popular resort of New York business men, many having their homes here. Population 1890, 8,217.

NEW SIBERIAN ISLANDS. See **SIBERIA**, Vol. XXII, p. 6.

NEW SOUTH WALES. For history, geography, etc., see **NEW SOUTH WALES**, Vol. XVII, pp. 407-411.

GOVERNMENT. The constitution vests the legislative power in a Parliament of two houses, the first called the Legislative Council, and the second the Legislative Assembly. The Legislative Council consists of not less than 21 members (69 in 1895), appointed by the crown for life, and the Assembly of 125 members in 1895. The duration of a Parliament is not more than three years. By an act of Sept. 21, 1889, each member of the legislative assembly is paid \$1,500 per annum. To be eligible or entitled to vote, a man must be of age, a native or naturalized subject of the British sovereign and have resided one year in the colony and three months in his electoral district before an election. The holder of real property in any constituency also is allowed to vote. The voting is taken by secret ballot. In 1895 there were 257,558 electors enrolled, or 20.3 per cent of the population. At the last general election, in 1895, 63.18 per cent of the electors on the roll voted. The executive is in the hands of a governor, appointed by the imperial government, who has a salary of \$35,000. The governor is assisted by a cabinet of ten ministers.

AREA AND POPULATION. The area of the colony is 310,700 square miles. The estimated population, June 30, 1895, was 1,268,150. According to the census of 1891, of the total population only .73 per cent were aborigines and the white persons born in the colony formed 64 per cent. The census population of Sydney, the capital, in 1894, was 423,600, including suburbs.

JUDICIARY. The legal business of the colony is under the Department of Justice, administered by the Minister of Justice, to whom the supreme, circuit and district courts are responsible. There is a supreme court, with a chief justice and six puisne judges. All prisoners charged with capital crimes are tried by a jury of twelve persons. Circuit courts are held at the principal towns in the colony twice a year. District courts are established for the trial of civil causes in which the amount claimed does not exceed \$1,000. They are presided over by judges specially appointed, who also perform the duties of chairmen at quarter sessions, at which prisoners charged with other offenses than capital crimes are tried. In the metropolitan district, police courts are presided over by stipendiary magistrates; in the country districts, police magistrates and justices of the peace adjudicate. The licensing of houses for the sale of spirituous and fermented liquors is trans-

acted by magistrates specially appointed for that purpose.

RELIGION. Since 1862 there has been no aid given to any church by the state. The principal denominations are Church of England, Roman Catholic, Presbyterian and Methodist. The Salvation Army has also a strong following.

EDUCATION. In 1880 state aid to denominational schools was abolished and instruction made compulsory, between the ages of 6 and 14 years; the children of the poor are educated free. There are not only primary public schools, but also high-schools for both sexes. There were, in 1894, 2,508 state schools, with an enrollment of 206,265 pupils and 4,453 teachers. The gross expenditure for the year was about \$3,305,275. Of private schools there were 863, with 2,966 teachers and 51,016 pupils. Of these, 285 schools, with 1,453 teachers and 35,150 pupils, were Roman Catholic. The University of Sydney was founded in 1852, and its degrees in arts, law and medicine are recognized as on an equality with those of the United Kingdom. The Government grants a yearly subsidy of \$90,000. The total revenue for 1894 was \$112,275. There were 6,543 students attending during session, 1893-94. There are 46 professors and lecturers. There is a free public library at Sydney, with 104,140 volumes in 1894. In addition, there were 6 schools of a charitable character, with 26 teachers and 801 pupils.

FINANCE. The revenue for 1894, arising from taxation, land revenue and services (railway, postal, telegraph, etc.), was \$46,500,555, while the expenditures aggregated \$45,893,530. At the census of 1891 the estimated public wealth of the colony was \$896,475,000, the estimated private wealth was \$2,037,025,000, making the total wealth of the colony \$2,933,500,000. The public debt of the colony, Jan. 1, 1895, was \$201,021,265.

DEFENSE. In 1894 the land force of the colony comprised 4,935 men, of whom 549 formed the regular military force, 4,386 volunteers, who were partially paid, and 650 reserves. The naval force is composed of 544 men. The military expenditure of the colony in 1894 was \$1,361,890.

AGRICULTURE. In 1894 there was 1,325,964 acres, or a little over one half per cent of the area of the colony under cultivation. The cultivated land is principally to be found in small holdings of less than 500 acres. The area sold is not to exceed 200,000 acres annually, and the maximum area for purchasers is 640 acres.

In 1895, 647,483 acres sown to wheat, produced 7,041,378 bushels; 208,308 acres planted with maize, produced 5,625,533 bushels; 30,636 acres sown to oats, produced 562,725 bushels. Sugar-cane was raised to the amount of 265,254 tons. Vineyards, with an area of 7,577 acres, produced 731,683 gallons of wine, 6,356 gallons of brandy and 4,617 tons of table-fruit. The principal fruit-culture of the colony is that of the orange. There were in 1895, 12,204 acres in oranges, with an estimated production of 10,879,065 dozen. On Jan. 1, 1895, the colony had 56,977,270 sheep, 2,465,411 horned cattle, 518,181 horses, 273,359 pigs. In 1887 a forest conservation department was created, and attached

to one of the principal state departments. There are 1,084 state forests, covering 5,488,808 acres.

MINERAL PRODUCTION. The mineral products are many, and mining forms a very important industry. Gold, known in 1823, was worked first in 1851, near Bathurst. It is found over an area of 70,000 square miles, in granite, porphyry, diorite, quartz, breccias and alluvial deposits. Dry-blowing is employed by miners where water is scarce. Often gold is mixed with silver, copper or tin, and the ore is worth, according to purity, from \$18 to \$21 an ounce. The output to the end of 1894 was \$205,053,345, though only \$2,170,350 in 1889. Silver, found at Boorook, Sunny Corner, etc., abounds in the Barrier Ranges near South Australia, at Silvertown, Thackaringa, etc., where there are over four thousand miners. Discovered in 1883, in an almost rainless region, the silver area is 100 miles by 12. In 1889 the product of silver for the colony was \$470,750. Copper, first mined in 1858, yielded \$318,085 in 1894, its ore being known to extend over eight thousand square miles. Tin, worked since 1872, from streams and lodes in granite, has fields of equal area, with a yield in 1893 of \$630,570. Lead is chiefly obtained from silver-mines. Antimony, manganese, bismuth, etc., are mined. Iron is abundant, but not profitable to work, owing to the cost of labor. Precious stones, as the diamond, emerald, zircon, sapphire, topaz, etc., occur in granite localities. Asbestos, zinc, mercury, cobalt and alum are exported. Graphite, kaolin and building-stone enrich industry. Coal is the most valuable mineral of New South Wales. It extends over 24,000 square miles; \$147,993,620 worth was mined during 1860-94. The yield for 1894 was about \$5,777,865 by 3,672,076 tons. Kerosene shale, rich in the Blue Mountains, yields 150 gallons crude oil per ton. Its product for one year was \$383,335.

MANUFACTURES. The report of 1894 gives the number of manufactories of various classes as 2,647, employing 42,751 hands, with a capital invested of \$78,248,520.

IMPORTS AND EXPORTS. The imports for 1894 amounted to \$79,009,705, and the exports to \$102,888,365.

RAILROADS, TELEGRAPH, ETC. At the end of 1893 there were 6,260 miles of government roads formed, metaled and graveled; 4,148 formed and properly drained; also 7,344 miles of roads in municipalities.

The following are particulars of the railways in the colony, June 30, 1895: Lines open for traffic, 2,531 miles owned by the government, and 85 miles of private railways. The total amount of money expended on railway construction to June 30, 1894, was \$183,056,680. The net earnings for 1894-95 amounted to \$6,553,075.

The tramways are the property of the government. There were on June 30, 1893, 419 miles open for traffic.

In 1894 there were 1,445 postoffices.

At the end of the year 1894 there were in the colony 28,085 miles of telegraph wire in operation, the cost of constructing which amounted to \$4,157,375.

BANKS. The bank assets of New South Wales

amount to over \$235,976,070, about two thirds being deposits. The Savings Bank of New South Wales, established in 1832, of which the governor is president, in 1893 reported 13 branches besides the postoffice savings banks. Both branches, Jan. 1, 1895, had 190,307 depositors, whose aggregate deposits amounted to \$36,085,000, giving an average account of \$185.

The colony controls 14 lighthouses, one of which, the Macquarie, was the first south of the equator to employ electric lighting.

***NEWSPAPERS IN THE UNITED STATES,** are periodical publications containing records of current events and items of public interest, and are issued at regular intervals, i.e., daily, semi-weekly, weekly, etc. (For the origin and early history of newspapers, see *NEWSPAPERS*, Vol. XVII, pp. 412-437.) Periodicals devoted to the dissemination of news in its various forms are more properly called newspapers, as they publish the most important happenings in the various walks of business, social and religious life, with or without comment. They also include in their columns advertisements of the various articles of trade and commerce of the country in which they are published, as well as many from foreign parts. The great "art of journalism" is to be first in obtaining all legitimate news, first in accuracy and in the fairness in which it is stated, and first in securing the freshest, brightest and most picturesque features for the general reader. These are some of the requirements of the modern newspaper. There should be, in addition to this, a sound moral force underlying all the editorial comment,—a force that first and above all is American, believes in our institutions, is in favor of our Constitution and the Declaration of Independence, and that never forgets that the flag of the Republic must ever be regarded as the symbol of a government that has for its fundamental principles equality, fraternity and liberty.

It is only within a comparatively few years that practically all the people read newspapers. But a decade ago it was considered a luxury not to be indulged to subscribe for a daily paper, except in cities and large towns. Newspapers were then for the classes, and the classes that habitually read daily prints were people chiefly interested in the large affairs of life; in the dignified, the moral, the esthetic side of life. It was then not only easy for the newspapers to observe all the proprieties and exclude everything that savored of sensation, but it was necessary for them to do so.

It is different now. Newspapers have spread over the whole world. Everybody reads them. Where one copy was sold a quarter of a century ago, thousands now go out among the people. No one is too poor, none live too remote, to have a daily newspaper. They must now be made for the masses instead of for the classes, and they must be made as the masses want them made.

A newspaper must stand for something: if it stands for business alone, the world will know it; if it stands for character and principle, for purity in public and private life, for honesty and fairness in our relations with our fellow-men, the newspaper is

an educating power for good in all that makes men and women better. If a newspaper stands for nothing but success, gained at whatever cost, its influence as an educator will be a cipher. If an editor is indifferent as to whether the world grows better, his newspaper must reflect that spirit. If he has faith in humanity, in the power of human love to make this life look bright and cheerful, unconsciously he will mold his editorial words to deepen and broaden that faith.

Primarily, the publication of a newspaper is a business enterprise. The world recognizes and applauds success. Self-preservation requires that the editor and his family shall be fed and clothed, and happiness must come in this way. But there are successful newspapers—in the conduct of which sensation is held to be enterprise—which we do not wish to admit to our homes.

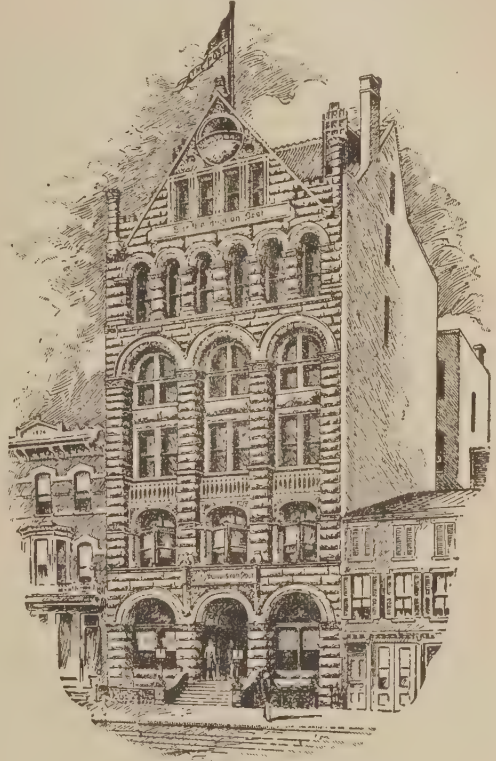
American newspapers are improving. The number of those which resort more to argument and less to vilification and abuse is increasing. As intelligence becomes more widespread, the moral character of American newspapers improves. The most influential newspaper in any American field to-day is the one that is run upon the highest intellectual and moral plane, the one that uses the best sense and the best morals. Gradually the paper that is guided by no moral or political principle is losing its hold. It is dropping to the rear. The best paper in every field—the paper with a moral purpose—is forging ahead and leaving the time-serving, characterless sheet in the rear, where it of right belongs.

There is but one other desideratum of a perfect newspaper, and that is, that it should give all the news. To do this the news journal must also contain advertisements. These are news, the freshest, the most constantly varied, the most interesting news of all. Without advertisements successful newspapers would be impossible and they would perish from the earth. By their means all can learn where best and cheapest to supply their wants, and by advertisements all can make their wants known. It is the task of the journalist to furnish his readers with a paper which shall combine the double functions of a narrator of the story of the world from day to day and of an epitome of commercial information. To render his paper an acceptable medium to the public who want to sell or to buy, the journalist must offer the advantage of an extensive circulation. To obtain this circulation he must provide the news-seeking public with the best and fullest information gathered from every corner of the earth. The gathering and publishing of news is an expensive process, but for this the advertising columns furnish the "sinews of war." The first-class newspaper attracts the first-class advertisements; the advertisements, in a large measure, enable the publisher to create and maintain the first-class newspaper.

The methods of gathering news for the great commercial dailies or the country weeklies vary only in degree. The publications of the larger cities require a corps of writers whose duty it is to cover all departments of news which may be of interest to

the reading public. The possibilities, therefore, of city journalism are almost unlimited; while in the smaller cities the opportunities for enterprise are somewhat restricted.

In the making of a metropolitan daily there are certain positions which are allotted to specialists, and these, in a measure, become fixtures on the papers with which they are identified. The person upon whom supreme responsibility rests in a daily newspaper office is generally known as the editor-in-chief. He represents more directly the publisher or the proprietors of the newspaper than does any other individual. It is his duty to see that the paper con-



"WASHINGTON POST" BUILDING.

forms to the general policy decided upon by the owners of the paper, and that the proper persons are employed to carry out these instructions. Next in importance is the managing editor, upon whom the real labor of getting out a newspaper devolves. He has the selection, in almost all cases, of the personnel of editorial writers, city editor, exchange editor, and the many other assistants which vary considerably in different newspaper offices. It is customary, among the larger metropolitan dailies, to hold daily conferences, during which the views of the more important representatives of the paper are presented, public matters discussed and a general policy outlined, which then is followed out as nearly as possible by the subordinates.

The city editor is vested with the control of the "local" or city staff—reporters who gather and write what is known as "the local news," which includes

nearly everything that is printed in the paper that does not come by telegraph or appear on the editorial page. These reporters are given definite assignments throughout the day, and go from their respective offices with a fixed object to accomplish, and are not sent out on a roving commission to see what they can find, as has popularly been supposed. The work of gathering city news has been simplified greatly during the last 15 years by the establishment of local city press associations, to cover what is known as routine news, i.e., the courts, police, hospitals and other headquarters where news is to be obtained daily by keeping a close watch on public affairs and awaiting new developments. On important papers there is a day city editor and a night one. There are office men also to read copy, prepare headings and keep a schedule. Reportorial work is divided according to the amount of news going. The city editor enters on his assignment-book, days and weeks in advance, all regular meetings of civic bodies, clubs and organizations of which he can obtain knowledge, and deposes reporters to attend to them. The court reporters spend the day



"NEW YORK HERALD" BUILDING.

at the courts, prepare the records and report all cases of importance. Men are detailed specially for trials, for the city council, the county board and other municipal centers. One man attends to all routine railroad matters, another to the lake, river or ocean marine.

The telegraph editor on a newspaper has the responsibility of caring for all of the news matter which comes over the wires into the newspaper office, whether it be from press associations or from special correspondents throughout the country. These special correspondents represent the newspaper with which they are identified, in the cities in which they live, and are paid, in most instances, for the amount of news they furnish from week to week or month to month. In cases of news of supreme importance, it is customary for newspapers to send special representatives from headquarters to other cities, they making a report for their individual paper of the event which they are assigned to cover. This may be a cyclone horror, a national convention, a great fire in another city, a railroad wreck, a political gathering, or may be for the purpose of getting more complete details on some subject which the particular paper upon which the correspondent is engaged is interested.

Of other departments of a newspaper, the more important not yet mentioned are those of the exchange and news editors. The exchange editor is generally a man of considerable experience, and his work is to select from the "exchanges" all kinds of matter for use by the various departments. He clips horse and baseball, and similar notes for the sporting-editor; notices of change of pastorates for the religious column; musical and dramatic gossip, short stories, matters relating to local celebrities, important news items of which only brief mention has been made in the telegraph columns, etc. The news editor takes care of news items, and in most cases has control of the out-of-town correspondents. Most newspapers make a feature of treating exhaustively sporting-matters in their various forms, the drama, household affairs, insurance and banking, trade and financial reviews, and real estate. These subjects are handled by specialists, who devote a large portion of their time to familiarizing themselves with the news features of their particular department. There is a musical and dramatic critic on nearly all newspapers, and on some a religious editor is maintained, while the doings of secret societies and benevolent organizations form a department of many of them, and others make a specialty of reporting labor movements.

Once the news of the day has been gathered into the newspaper office, in various forms, the process of editing then begins. This work is done by professionals, who are experts in preparing "copy" for the printer. The copy thus prepared is then turned over to the foreman of the composing-room, whose duty it is to see that the manuscript which comes into his hands is put into type; and this, after proofs have been taken, is carefully read by proof-readers who compare the proofs of the compositors' work with the original manuscript, and mark for correction any errors that may be discovered in the process of type-setting. This step being accomplished, the corrected type is then placed in galleys and taken to an imposing-stone, where it is deposited. It is then ready for "making-up" into the form in which it will appear in the newspaper. In this work of "making-up," all matter relating to the different departments is kept separate; and, when the work of arranging the type is completed, the pages are then full and are "locked up" ready for the forms to be sent to the stereotyping-room. Great improvement has been effected in the process of duplicating the types, so that it is not necessary to print newspapers direct from the type. Instead, *papier-mâché* matrices are now made, which serve as molds, and from these a casting is made in exact duplicate of the original type; from this casting the newspaper is printed. These metal plates can be duplicated in quantities, and thus a large edition can be run from extra sets, so that within a short time fifty to one hundred thousand copies of a newspaper may be printed and ready for distribution through the various channels through which newspapers are circulated.

In the mechanical economy of making the modern newspaper much saving in the cost of production has been made by the recent adoption of type-set-

ting machines, which reduce the cost of composition about fifty per cent. These machines are rapidly taking the place of hand-labor, especially in the larger cities. Some opposition on the part of labor-unions followed their initial introduction; but this has been removed by a rule which requires the machine-operators to become members of the typographical unions in the cities in which the operators work, and by the adoption of a fixed scale of prices.

Newspapers are circulated through the mails as second-class mail matter, and postage is charged at the rate of one cent a pound. Under the present postal regulations, however, copies of a publication issued less frequently than once a week, addressed to a person residing in the city in which it is published, must be prepaid by stamps, at the rate of a cent for four ounces or four cents a pound. The weeklies and dailies go through the mails at a regular pound rate without the affixing of stamps, bills being rendered by the postal authorities and settlements made weekly or monthly according to the frequency of the publication.

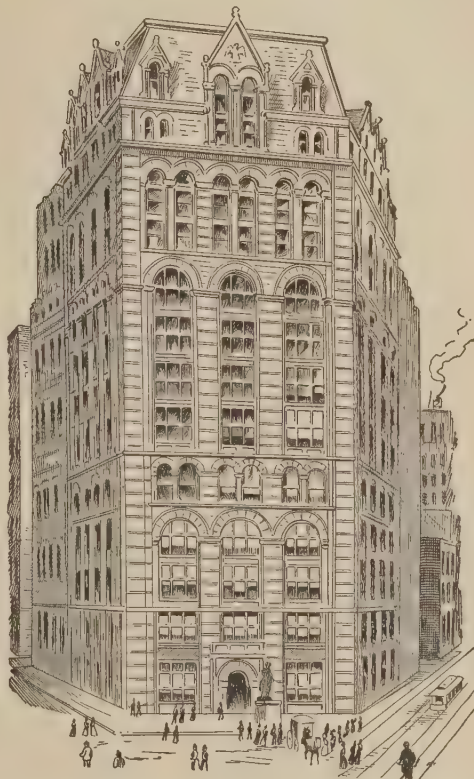
Newspapers frequently vary in size (number of pages) from day to day, according to the volume of news and the pressure of advertisers for space. It is the common custom to adjust the size of a newspaper to meet the requirements of the advertising columns, and when the advertising patronage is light the size of the newspaper is reduced in accordance and the news made to suit these conditions, unless news matters of unusual importance are before the public, in which event the question of the advertising patronage cuts little or no figure with the publisher or editor of the paper. In addition to the regular issues, many newspapers, especially those issued in the evening, get out "extras," in which the more important and later news features are displayed prominently, and which, in many cases, have a large sale; especially is this so where some event of unusual importance is chronicled. In addition to these extras, many newspapers have special editions, some to emphasize the importance to their readers, and those whom they seek to become such, of their particular paper and its desire to cater to the reader's special wants.

Illustrations now form a most important part in the make-up of a complete newspaper. While there are a great many publications which do not use cuts to illustrate their news and other features, the majority of them do so, and the number is increasing rapidly. Some newspapers do not go beyond the use of portraits of prominent personages; others illustrate every article possible. These illustrations are made by what is known as the zinc-etching process, the original of the picture being drawn with pen and ink and reproduced by photography on glass and then transferred to metal. Chalk-plates, formerly in common use, are used but little now.

The growth of the Sunday newspaper has been very rapid during recent years, and has reached abnormal proportions. It is not an unusual occurrence for a metropolitan daily to issue more than fifty pages on Sunday. The presence and rapid growth of these Sunday newspapers has brought some antagonism from the religious element, who

have declared that the Sunday papers "rob the employees of newspaper offices of their Sunday rest." It is a fact, however, that the work of preparing a Sunday newspaper begins early in the week, and is almost finished when Sunday begins. The effect of the circulation of newspapers on Sunday is quite another issue, and one which can be defended less successfully.

Another important change in the making of newspapers has been the recent reduction in price. Practically, the day of the five-cent newspaper is past, one cent being the prevailing price now



"NEW YORK TIMES" BUILDING.

charged for morning and evening papers. This change has already taken its course westward, until now the Pacific Slope has been reached and penny newspapers are increasing rapidly in California, where a few years ago no coin whatever of less value than five cents was in circulation.

The country newspaper of to-day is vastly superior to that of a few years ago, on account of the introduction of what is known as "plate-matter" and "patent insides." The former is prepared in large cities by concerns generally known as newspaper unions, who make a business of editing and compiling late news matter from the metropolitan dailies, putting it into plate form, column width, and forwarding the plates to their various subscribers, who are

generally publishers of papers of small circulation. These plates, when received, are arranged according to the peculiarities and make-up of the particular papers receiving them, and are used in lieu of type set at place of publication. "Patent insides," so called, are sheets printed on one side only, local matter being set and printed at the office of publication. By these methods of securing news small country publishers are enabled to have the benefit of the exchanges of the world, and at a less expense than the composition alone would amount to if prepared in their own offices.

The rapid growth and phenomenal success of a number of American newspapers has caused many of



"NEW YORK TRIBUNE" BUILDING.

them to invest their surplus capital in handsome fire-proof buildings, which in most cases are used for general office purposes, as well as for the home of the newspaper. These huge structures in many cases represent the highest skill in the builder's art, and are a desirable addition to the architectural beauties of the cities in which they are located. Among the more prominent of these buildings are the *New York Herald*, *Times*, *World*, *Tribune*, *Mail and Express*, *Washington Post*, *Chicago Herald*, *St. Paul Globe*, *San Francisco Chronicle*, *Seattle Post-Intelligencer*, and *Portland Oregonian*.

What is known as the "business office" of a newspaper is that portion of the publication which has more directly to do with the actual publication of a newspaper. In each newspaper office there is what is generally known as a "business manager," whose duty it is to make contracts with advertisers,

purchase the necessary supplies with which to publish the newspaper, see that proper accounts are kept, including records of the circulation, etc., and that the employees are paid their salaries. While the two departments, business and editorial, of a newspaper, are working to the same end, i.e., the successful publication of a newspaper according to the ideas of the owners, they are sometimes in conflict and not infrequently the cause of more or less contention as to the individual rights of each; but probably no more so than occurs in other large establishments devoted to mercantile pursuits.

Another form of supplying reading-matter to American newspapers is by the syndicate system. The persons conducting these syndicates make arrangements with authors and specialists in certain lines for signed articles. These are re-sold to the newspapers—one only in a city—and generally are published simultaneously. By this plan one paper in each city is often able to secure an article of unusual merit, and from the pens of eminent persons, at a nominal figure, sometimes as low as one dollar and a half a column, whereas, if they contracted directly with the author, they would be compelled to pay many times the cost. By selling the same article to different newspapers, a large profit is sometimes made in this way by the newspaper syndicates, which are growing in number and importance. Some writers syndicate their work direct without the aid of the middleman.

The aggressiveness of some newspapers has caused a frequency of libel suits, out of which has grown various libel laws, good, bad and indifferent. The frequent attempts of lawmakers to "muzzle the press" have not met with the success of former days; and although the efforts of the class most interested in curbing the spirit of the press and curtailing its liberties are not less frequent on account of failure, they are getting perceptibly weaker and shorter in scope. Of course there are instances—and no one regrets the fact more than the newspaper men themselves—in which flagrant violations of good sense in printing the news occurs; but these exceptions are not common, and the spirit in which they are met and denounced by other newspapers generally acts as a preventive of their recurrence.

Efforts have been made, from time to time, to adopt the custom of printing the signature of the writers who contribute to the daily press, but no great success has been attained in this direction, except in occasional instances. Signed articles have, however, had a tendency to secure for the publisher critical and technically correct contributions from specialists, which are deemed more able and worthy of attention than those supplied by the average editor, who is an expert in no profession, and yet must write of them all. It is hardly possible that the system of signed articles, even if adopted, will be carried so far that the publisher may avoid the responsibility for libel suits for the statements made in signed articles; and yet this has been discussed as a possibility. While the plan has many advantages, as well as drawbacks, the signed article in the newspaper is becoming more and more familiar, and marks another departure in modern journal-

ism; and in so far as it secures better and more careful—that is to say, more responsible—work, it is to be commended.

Newspaper writers are now measured according to their merits, and the measure is taken very swiftly, whether the individual be man or woman. Women are succeeding, and have succeeded, in every branch of journalism, from the mere setting of the type to the absolute control of a great publication. Men as a class are apt to employ slang, colloquialisms, technical phrases and business language. Women, on the other hand, seldom fall into these errors, but sin on the side of brilliant rhetoric and so-called "fine writing." They have a natural inclination toward qualifying things that they like with pretty words: a girl is always "pretty" or "charming"; a gown "elegant" or "lovely"; a book "delightful" or "splendid." As between the two faults, the woman's is less objectionable. Few newspaper women care to report fights, accidents, or other facts involving shame, suffering or disgrace; men, on the other hand, have a natural aversion to spending much time upon details. They are much quicker, however, to perceive news and to secure it. The practice known as "faking" is not uncommon with newspaper men, but is very rare with newspaper women. The feeling between the two sexes is very amicable, each recognizing where the other can do better work. The great increase of newspaper women is due, not to any competition between men and women, but to the fact that the development of the modern newspaper necessitates the gathering of news where women are more qualified to act than men. This kind of news includes the description of social events, interviews with distinguished women, women's clubs, women's colleges, women's industries, and women's work in art, literature and music. A few of the larger dailies have women employed as editorial writers, and in one or two instances they have attained remarkable success in this line of work, although the tendency of their thoughts and inclinations is generally to lighter veins.

Attempts have been made from time to time to establish schools of journalism, but without signal success. Joseph Medill, the distinguished editor of the Chicago *Tribune*, has said: "You will not go far astray if you lay down as your major postulate that the real journalist, like the real poet, must be born, and cannot be made by art." Very few of the more prominent newspaper editors are believers in schools of journalism, and think it would be a mistake to establish them in connection with universities and colleges. As has been well said by Colonel Charles H. Jones, of St. Louis: "That man is best equipped for the work of journalism who knows most of what is taught in all the schools. The best education for a journalist is the mental training which he gets from the widest possible range of studies in the colleges or universities—I mean the widest range of studies that he can really master; and after he has equipped himself with all the knowledge that can be obtained from this general curriculum, he will find it necessary, as soon as he begins the practical work of journalism, to widen

his knowledge and enlarge his range of information in all possible ways."

To be a successful journalist, a man must have what is technically known in the profession as "a nose for news." Without this he cannot succeed with the best education that it is possible to give him.

Friendship for newspaper men has long been held to be a necessity in ratio to the success of the individual who follows a public career. Chauncey M. Depew is a brilliant example of the class of men who are most accessible to reporters. It is said that Mr. Depew sees more newspaper men, and oftener, than any other recognized prominent person in the metropolis of New York; they breakfast, dine and sup with him, or rather, that is what it



"PORTLAND OREGONIAN" BUILDING.

amounts to. He has been called "the reporter's best friend." Russell Sage was formerly as accessible to reporters and the general public as is Dr. Depew, but since the Norcross incident has been of a more exclusive and retiring disposition.

Incomes of newspapers are difficult to get at. Vast fortunes have been made and lost in the launching of newspapers; as much as half a million dollars has been expended within a year or two in the building-up of a newspaper which has proved a failure, while much less sums judiciously expended have produced publications which have been successful from the start, and in many instances have brought their founders immense fortunes in a few years. The general impression is, that the most of the income of newspapers is from advertising; but according to the recent census the revenue is about equally balanced. The census figures are as follows:

From advertising, \$71,243,087; from circulation, \$72,343,361; the slight difference being in favor of the subscribers. The number of copies of newspapers printed during a year in the United States has reached the marvelous total of 4,681,113,530, and this is an increase of 2,600,000,000 over the figures obtained by the census of 1880. In the six years since the eleventh census was taken, the increase went on, and it is safe to say that the total of six thousand million has been passed. It is impossible to grasp all that this means. Perhaps the best illustration is, that if one person were invested with enough life, and were to give twelve hours a day to constant reading, he would be five or six thousand years old before he got through the papers and periodicals printed in the United States in a year.

The following table gives the number of newspapers and other publications which are known to have been issued in this country since 1869:

	DAILY.	TWICE WEEKLY.	SEMIWEEKLY.	WEEKLY.	BIWEEKLY AND SEMI-MONTHLY.	MONTHLY.	BIMONTHLY.	QUARTERLY.	TOTAL.
1869 ----	519	120	91	3,912	79	459	7	32	5,219
1870 ----	574	107	115	4,295	96	622	13	49	5,871
1871 ----	594	105	112	4,380	116	677	13	59	6,056
1872 ----	525	107	113	4,808	113	690	4	55	6,519
1873 ----	647	96	101	5,175	110	678	9	59	6,875
1874 ----	678	83	92	5,554	120	744	11	57	7,339
1875 ----	718	80	107	5,957	130	802	8	68	7,870
1876 ----	738	70	121	6,235	138	747	13	67	8,129
1877 ----	709	60	115	6,221	129	664	13	57	7,958
1878 ----	729	59	120	6,540	114	708	15	55	8,340
1879 ----	742	60	121	6,847	131	732	17	53	8,703
1880 ----	845	58	129	7,590	166	868	14	55	9,723
1881 ----	921	56	116	7,955	170	969	14	66	10,267
1882 ----	996	51	120	8,183	200	976	14	71	10,611
1883 ----	1,062	50	122	8,635	222	1,034	12	59	11,196
1884 ----	1,178	43	142	9,492	290	1,427	23	76	12,671
1885 ----	1,183	39	139	10,082	292	1,604	33	122	13,494
1886 ----	1,216	41	152	10,685	313	1,603	26	124	14,160
1887 ----	1,311	39	165	11,116	285	1,655	30	105	14,706
1888 ----	1,423	42	177	11,785	290	1,704	25	109	15,555
1889 ----	1,494	36	207	12,234	289	1,898	36	125	16,310
1890 ----	1,536	29	202	12,603	342	2,076	37	123	16,948
1891 ----	1,700	39	221	13,420	397	2,506	75	178	18,536
1892 ----	1,759	33	209	13,404	307	2,754	56	192	18,714
1893 ----	1,855	31	237	14,017	434	3,125	78	229	20,006
1894 ----	1,942	32	246	14,662	379	2,639	70	199	20,160
1895 ----	2,050	40	321	14,685	385	2,676	55	183	20,395
1896 ----	2,205	43	394	14,614	431	2,723	58	162	20,630

From this table it will be seen that during the year 1896 there were 20,630 publications of various kinds issued. This is only 235 greater than was the issue for 1895. Dailies increased about seven per cent, tri-weeklies nearly ten per cent and semi-weeklies nearly twenty per cent. There was some slight increase in the number of bi-weeklies, semi-monthlies, monthlies and bi-monthlies. Quarterlies, semi-quarterlies and tri-monthlies fell off in number, and for the first time in nearly thirty years the number of weekly papers was smaller than for the preceding year. This decrease is due to the inroads which the cheap daily papers are making.

The table on following page shows the number and frequency of issue of newspapers and periodi-

cals published in the United States, Dominion of Canada and Newfoundland during the year 1896.

To give their readers all the news of the world, the great newspapers of the United States now rely upon special news-gatherers in every news-center of the globe. Many of the noted journalists of the country are connected with these agencies, which distribute vast quantities of news to American papers. The phenomenal progress and success of the American newspaper can, in a large measure, be attributed to the methods of these news-gathering agencies, foremost among which is the "Associated Press." Its close identification with the newspapers of America for the past decade or more, and its history, is in a large measure the history of journalism in America. Without these news-gathering aids it would not be possible, even in this day of rapid news-distribution, with the mechanical perfection that has been attained in this profession, to print as complete newspapers from day to day as are now to be found in all large cities. A brief outline history, therefore, of the inception and growth of the Associated Press should be of interest to those who desire a more complete knowledge of American newspapers, and especially of their development.

Between the years 1835 and 1840, and before the Atlantic cable and telegraph were in use, the New York papers established "pony expresses" and similar means to get the news from Washington, which was then, as now, a great news-center. They also established a line of small, fast-sailing boats to run out and meet the incoming foreign sailing-vessels. Then when the telegraph came into use they enlarged that field somewhat. The New York papers rather monopolized this news-gathering feature of the business in the beginning. The New York *Herald*, New York *Sun*, Philadelphia *Public Ledger* and Baltimore *Sun* all were established about the same time—1835. The Philadelphia *Public Ledger* was established by people who left the New York *Sun*; so was the Baltimore *Sun*; and then the Albany papers came into existence. Finally, these outside papers went to New York and said: "We wish to use this news you are gathering, and we will pay for it; fix a price, and we will pay for it delivered at our office over the telegraph-wires." The New York papers assented to the arrangement, and established relations with these interior papers conditioned upon the interior papers' paying them a fixed charge per week, and also furnishing the news of their immediate vicinage in exchange. That was the way the Associated Press began, and has continued to grow into the great news-gathering organization that it now is. The New York papers then were serving papers in New England, in New York state, Pennsylvania, and in the West. As the business enlarged, the New England papers decided to organize an association called the New England Associated Press. It was a distinct body, and, instead of making individual contracts, made a contract as an organization with the New York papers. Then the New York papers organized themselves into an association called the New York Associated Press, and established their own agent or manager. Under their rules, all of the news that the New York *Herald*, the New York *Sun*

	DAILY.	TRIWEEKLY.	SEMIWEEKLY.	WEEKLY.	TRIMONTHLY.	BIWEEKLY.	SEMI-MONTHLY.	MONTHLY.	SEMI-QUARTERLY.	BI-MONTHLY.	QUARTERLY.	TOTAL.
Alabama	20	--	4	167	--	3	3	15	--	--	--	212
Alaska	--	--	--	3	--	--	--	1	--	--	--	4
Arizona	10	--	--	35	--	--	--	1	--	--	--	46
Arkansas	26	--	1	198	--	--	5	18	--	--	2	250
California	113	1	9	450	--	5	9	87	--	--	--	674
Colorado	38	--	3	217	--	--	2	26	--	--	--	286
Connecticut	51	--	5	108	--	1	9	35	--	3	7	219
Delaware	5	--	--	28	--	--	1	4	--	--	--	38
District of Columbia	5	--	--	30	--	--	2	25	1	2	3	68
Florida	16	--	3	104	--	1	4	11	--	--	--	139
Georgia	28	--	2	252	--	--	6	38	--	--	1	327
Idaho	3	--	3	54	--	--	1	3	--	--	--	64
Illinois	162	2	29	1,060	1	7	36	252	1	5	16	1,571
Indian Territory	3	--	--	46	--	--	--	1	--	--	--	50
Indiana	137	--	16	575	--	--	10	78	--	1	1	819
Iowa	75	3	24	839	--	1	9	76	--	1	6	1,034
Kansas	48	--	7	567	--	1	7	63	--	1	2	696
Kentucky	29	1	13	214	--	3	7	32	--	--	1	300
Louisiana	18	--	2	145	--	--	4	10	--	--	--	179
Maine	18	--	2	113	--	1	4	47	--	--	7	192
Maryland	16	--	2	139	--	2	2	38	--	--	5	204
Massachusetts	88	--	7	325	--	7	10	166	1	2	21	627
Michigan	68	1	14	581	--	4	12	78	--	3	1	762
Minnesota	38	--	2	442	1	4	15	45	--	1	1	549
Mississippi	9	2	4	152	--	--	6	12	--	--	--	185
Missouri	87	2	14	709	--	5	16	117	--	3	8	961
Montana	13	1	2	73	--	--	1	6	--	--	--	96
Nebraska	32	1	7	501	--	1	7	33	--	--	1	583
Nevada	9	--	2	14	--	--	1	--	--	--	--	26
New Hampshire	15	1	1	80	--	--	--	13	--	--	1	111
New Jersey	47	1	2	277	--	3	9	49	--	3	2	393
New Mexico	5	1	1	43	--	--	--	3	--	--	--	53
New York	183	3	46	1,080	--	13	39	530	--	15	41	1,950
North Carolina	21	--	2	166	--	--	9	19	--	--	1	218
North Dakota	9	--	--	118	--	--	1	8	--	--	--	136
Ohio	158	7	36	766	--	4	16	142	--	2	13	1,144
Oklahoma	11	--	1	79	--	--	1	9	--	--	--	101
Oregon	18	--	8	139	--	--	2	20	--	--	1	188
Pennsylvania	200	4	34	899	1	7	21	239	--	7	10	1,422
Rhode Island	16	--	3	40	--	3	--	11	--	1	1	75
South Carolina	10	1	10	92	--	--	5	4	--	1	--	123
South Dakota	26	1	3	210	--	1	1	15	--	--	--	257
Tennessee	19	--	7	213	--	2	3	37	--	--	1	282
Texas	64	1	12	575	--	1	3	41	--	--	1	698
Utah	8	1	7	41	--	--	3	6	--	--	--	66
Vermont	4	--	1	66	--	--	1	13	--	--	--	85
Virginia	31	3	5	178	--	--	2	42	--	1	4	266
Washington	18	2	2	171	--	1	4	24	--	--	1	223
West Virginia	15	--	3	134	--	1	1	15	--	--	--	169
Wisconsin	63	--	5	486	--	4	6	40	--	1	1	606
Wyoming	4	--	1	28	--	--	--	--	--	--	--	33
Total United States	2,110	40	367	14,022	3	87	316	2,598	3	53	161	19,760
British Columbia	6	--	3	15	--	--	2	1	--	--	--	27
Manitoba	3	--	2	32	--	--	--	10	--	1	1	49
New Brunswick	8	--	2	28	--	--	1	5	--	--	--	44
Northwest Territories	2	--	2	17	--	--	--	--	--	--	--	21
Nova Scotia	8	2	3	48	--	1	1	5	--	--	--	68
Ontario	47	--	8	364	--	3	10	80	--	--	--	512
Prince Edward Island	3	--	2	11	--	--	--	--	--	--	--	16
Quebec	16	1	4	75	--	2	5	24	--	1	--	128
Total Canada	93	3	26	590	--	6	19	125	--	2	1	865
Newfoundland	2	--	1	2	--	--	--	--	--	--	--	--
Grand total (1896)	2,205	43	394	14,614	3	93	335	2,723	3	55	162	20,630

or New York *Tribune* got they turned into a common pool; in other words, they "pooled their news." One copy of a piece of news was dispatched to the *Herald* office, or *Sun* office, or *Tribune* office, as the case might be, and another copy of the same thing—a duplicate—would go to the New York Associated

Press office, the several papers simply combining to use their special service to maintain an association. After making this contract with the New England Associated Press, the larger association made one with the New York State Associated Press, then with the Baltimore Associated Press, the Washington

Associated Press, and finally with the Western Associated Press.

Some years later, or about 1870, the Western Associated Press, principally, as well as some of these tributary associations, grew restive. They did not want to continue to be simply tributary to the New York association. There were two reasons for this: one was that the New York association controlled absolutely the character of the news to be gathered, and was selling this "pooled news" at a price that made their own cost them practically nothing. The tributary associations wanted not only a voice in the management, but they wanted the plan rearranged so that the New York papers would pay their proportion for gathering this news. In 1882, after some controversy, the Western Associated Press formally severed its relations with the New York association papers, put its own agents in London and in Washington, and began a competitive service. That competition lasted but a few weeks, when the New York Associated Press threw up its hands, and a compromise was effected by which the New York Associated Press and Western Associated Press entered into an alliance, the Eastern organization naming two members, the Western naming two, of a joint executive committee to control the details of the business. It was really an amalgamation of the two associations. A fifth man on this joint executive committee was taken from New York, while the general manager was taken from the West. That plan of working together continued for ten years.

Meanwhile a rival association had grown up, because one of the features of the Associated Press organization was that it was a close monopoly. No news could be served to any new paper in any town without the consent of the existing press papers in that town—the unanimous consent. Each Associated Press paper had a veto upon any new paper coming in. The result was, that every now and then new papers would be started without the Associated Press service; and enough of them grew into positions important enough to enable them to establish a rival association, which was called the "United Press." This organization had been started under three or four names; it was called at one time the American Associated Press, then the National Associated Press, and finally it developed into the United Press. Not only was this new association fostered by the fact that there were papers outside of the Associated Press which required service, and which were willing to help support it, but there were also a number of rival telegraph companies, like the Mutual Union, the Baltimore and Ohio, the Postal, and others. The Associated Press was identified closely with the Western Union. These other telegraph companies came into existence as rivals of the Western Union, and the cost of service over their lines was very cheap; consequently it was an easy matter to establish a cheap news-service, and small papers could afford to pay for it. But it still remained true that the Associated Press held a commanding place.

In 1887 the United Press made a secret agreement with the executive committee of the Associated Press, the result of which was a practical union of the two organizations. The Associated Press was in

the nature of a co-operative organization; that is, its membership, particularly the Western Associated Press, extended to every paper of importance: they were all shareholders in it. The United Press was started originally on the same plan, and by the sale of stock in its treasury and by virtue of the arrangement made with the Associated Press, the United Press stock was soon in the hands of two or three men—that is, enough to control it absolutely—and they sold at a nominal price some of this stock to the executive committee of the Associated Press. It became a dividend-paying stock at once, for this reason: that the terms of the agreement between the United Press and the Associated Press provided that the Associated Press report should be given to the United Press in exchange for its report. The United Press then had no expense for gathering news, and was a money-making venture. This ran on until the truth was discovered, in 1891, and steps were taken to repudiate the arrangement. Then open warfare came on between the two organizations. Naturally, those members of the executive committee who were repudiated by their fellow-members went into the United Press and undertook to destroy the Associated Press. The struggle ended in the assignment of the United Press, March 29, 1897. The Western Associated Press was reorganized into the Associated Press, was made a national organization, and from 1893 it has gone on building itself up, until it is now in the normal position it held before the fight began.

This outline represents the relations of the Associated Press with the newspapers it serves in America. For the purpose of gathering foreign news it now has correspondence with the foreign news agents—the Reuter, Havas, Wolf, and the different agencies all over the world. It has contract relations with Reuter and Havas, which cover Great Britain and her colonies, France, Belgium, Switzerland, Portugal and some parts of South America; with the Wolf Agency of Berlin, which covers Germany, Austria and Hungary; with the Stefanie Agency, which covers Italy; with the Nordisches Telegram Bureau, which covers Russia; with the Norsky Telegram Bureau, which covers Norway; with the Svenska Telegram Bureau, which covers Sweden; and with the Agence de Constantinople, which covers Turkey. The way they operate is this: Take, for instance, the Stefanie Agency. It gathers all the news of Italy into Rome, and redistributes it to all the cities of Italy. Then it sends a budget of news—it may be 100 words or 500 words—to London, and also to Paris, and receives from each of these places a budget, which it in turn also distributes to the different cities of Italy. The Associated Press does the same. It has Walter Neef in London, and Count Wolf von Schierbrand in Berlin. All the news that comes into the Wolf Agency at Berlin, Von Schierbrand sees, and makes up a budget and telegraphs it to London. Reuter gets his budget from his different European agencies, and Walter Neef and his staff look over Reuter's dispatches and send to America whatever may be of interest here. This in turn is sent out to

papers in the United States. On the other hand, Reuter has his agent in the New York Associated Press office, looking over its dispatches and sending to him whatever may be of interest to Europeans. By this means there is a perfect system of exchange of news by the Associated Press all over the world. It operates also with a system of leased wires that run all over the United States and to the City of Mexico. Then for Canada it has an exchange arrangement with the Canadian Pacific railway by which that company gathers all of the news on its line and delivers to the Associated Press at four points in this country—Bangor, Buffalo, Detroit and Seattle. And the association delivers its news to them at these points for use in Canada.

MELVILLE E. STONE.

NEWT, same as TRITON. See Vol. XXIII, p. 577.

NEW TIPPERARY. See HOME RULE, in these Supplements.

NEWTON, a city and the capital of Jasper County, eastern Illinois, on the Embarras River, and on the Peoria, Decatur and Evansville and the Indiana and Illinois Southern railroads, 43 miles N.N.W. of Mount Carmel, on the Indiana and Illinois Central railroad, in an agricultural, dairy and coal region; has flour and grist-mills, creamery, canning and egg-case factories. It has a public library. Population 1890, 1,428.

NEWTON, a village and the capital of Jasper County, southeastern Iowa, 48 miles S.E. of Sullivan, and 35 miles E. of Des Moines. It is in a horse-breeding, stock-raising and agricultural region; has harvesting-machine works, flour-mills, two foundries, two canning factories, and machine-shops; also a national bank with \$50,000 capital. Population 1890, 2,564; 1895, 2,902.

NEWTON, a city and the capital of Harvey County, central Kansas, 135 miles S.W. of Topeka, on the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads; has a large carriage factory, flour-mills, planing-mills, and a machine factory. Valuable coal-mines and stone-quarries are in the vicinity; also a public library. Population 1890, 5,605; 1895, 5,148.

NEWTON, a city of Massachusetts. It has an electric street-railway to Boston via Boulevard, and to Waltham and Watertown; and on the Boston and Albany railroad. Newton Theological Seminary (Baptist) in 1896 had 8 instructors, 80 students, and a library of 22,000 volumes. The public library has 43,181 volumes. Population 1890, 24,379; 1895, 27,590. See also NEWTON, Vol. XVII, p. 438.

NEWTON, a town of Sussex County, northern New Jersey, 25 miles N.N.W. of Morristown, and 62 miles N.W. of New York; in an agricultural region; is a mining center, and manufactures shoes and paper boxes. Dennis library, founded in 1773, is here. Population 1890, 3,003; 1895, 3,426.

NEWTON, a village and the capital of Catawba County, western North Carolina, 25

miles W. of Statesville and 24 miles N.N.W. of Charlotte, on the Western North Carolina, the Chester and Lenoir and the Southern railroads. It contains Catawba College (Reformed), a co-educational institution, founded in 1851, and having in 1896 9 instructors, 275 students, and a library containing 2,000 volumes. Population 1890, 1,038.

NEWTON, ALFRED, a British ornithologist; born in Geneva, Switzerland, June 11, 1829. His parents were English, and he received his education in Magdalene College, Cambridge. He became professor of zoölogy and comparative anatomy in the University of Cambridge in 1866, and a recognized authority upon ornithology. He contributed the article on ORNITHOLOGY to this ENCYCLOPÆDIA, and numerous special articles on the various families of birds. Among his publications are *On the Zoölogy of Ancient Europe* (1862); *Zoölogy* (1875); he also edited Tunsall's *Ornithologia Britannica* (1880).

NEWTON, SIR CHARLES THOMAS, an English archæologist; born in Bradwardine, Herefordshire, in 1816. He was assistant curator of antiquities in the British Museum from 1840 to 1852. In the latter year he was made vice-consul at Mitylene. While holding this office he explored the islands and coasts of the Grecian Archipelago; discovered, in 1856, the mausoleum at Halicarnassus, and made extensive excavations at Cnidus and Branchidæ. In 1860 he became consul at Rome, and in 1861 he was made keeper of the Greek and Roman antiquities in the British Museum. In 1880 he was appointed professor of archæology in the University College, London. He published *A History of Discoveries at Halicarnassus, Cnidus and Branchidæ* (1862); *Travels and Discoveries in the Levant* (1865); *Ancient Greek Inscriptions in the British Museum* (1883); and other works of a similar nature. He became K.C.B. in 1894. He died in Westgate, Nov. 28, 1894.

NEWTON, HUBERT ANSON, an American astronomer; born in Sherburne, New York, March 19, 1830. He graduated at Yale in 1850; took a special course in mathematics; was appointed tutor in 1852; and next year was placed in charge of the mathematical department. In 1885 he was elected full professor. He spent a year abroad, and then settled down to his life-work at Yale. In pure mathematics he made researches on the construction of certain curves by points and on certain transcendental curves. His best-known work was in connection with meteors. By his labors, astronomers were able to connect the stream of meteors with the comet of 1866 as soon as the orbit of that comet was computed. His memoir of 1864, on sporadic meteors, determined their numbers, their frequency in the space traversed by the earth, and showed that most of them moved in long orbits, like the comets. He materially aided in the introduction, into educational books, of the continental metric system of weights and measures. He was one of the original members of the National Academy of Science appointed by Congress. He received

the degree of LL.D. from the Michigan University in 1868; was elected an associate fellow of the Royal Astronomical Society of Great Britain in 1872, and a fellow of the Philosophical Society of Edinburgh in 1886. After being for 25 years a member of the American Society for the Advancement of Science, he was elected its vice-president in 1875, and its president in 1885. He was secretary and director-in-chief of the Yale observatory and associate editor of the *American Journal of Science*. He was the oldest professor in active service at Yale at the time of his death, which occurred in New Haven, Connecticut, Aug. 12, 1896.

NEWTON, JOHN, an American engineer and general; born in Norfolk, Virginia, Aug. 24,



GENERAL JOHN NEWTON.

1823. He graduated at West Point in 1842, and served afterward as assistant professor of engineering there. In 1861 he had charge of a brigade and commanded the defenses of Washington. In the Peninsular campaign he was engaged in the actions at West Point, Gaines's Mills and Glendale, and afterward at South Mountain and Antietam. At Fredericksburg he commanded a division, and was soon after promoted major-general. He took part in the battles of Chancellorsville, Salem Heights and Gettysburg (1863), and in 1864 in the capture of Atlanta. After the war he returned to the engineer corps of the regular army. The important work conducted by General Newton after the war was the removal of the obstructions at Hell Gate and other points on the East River. In 1887 Mayor W. R. Grace of New York appointed him commissioner of public works in New York City, which office he also held during Mayor Hewitt's administration. He died May 1, 1895, in New York City.

NEWTOWN, a town of Fairfield County, western Connecticut, nine miles E. of Danbury and 22 miles S.W. of New Haven, on the New England railroad; has manufactories of lumber, carriages and wagons, buttons, combs, flour, cider, and has a public library. Population 1890, 3,539.

NEWTOWN, a borough of Bucks County, in northeastern Pennsylvania, five miles W. of Trenton, New Jersey, on the Philadelphia, Newtown and New York railroad. It was laid out by William Penn; is in an agricultural region, and has a planing-mill, carriage factory, iron foundry and machine-shop. Population 1890, 1,213.

NEW ULM, a city and the capital of Brown County, central southern Minnesota, 28 miles W.N.W. of Mankato, on the Minnesota River, and on the Chicago and North-Western railroad; was destroyed in a raid and massacre by the Indians in 1862, and in 1881 was almost entirely destroyed

by a cyclone; has iron, flour, sash and door, and other manufactures; is a trade center for a farming region. Population 1890, 3,741; 1895, 4,790.

NEW WESTMINSTER, a city of British Columbia, Canada, on the Fraser River, one of the termini of the Canadian Pacific railroad, 1,473 miles by rail W. of Winnipeg; has 12 feet of water in its harbor at ordinary high tide. Population 1891, 6,700.

NEW YORK had a population, in 1890, of 5,997,853. That of 1880 was 5,082,871, the increase constituting a gain of 18 per cent. The rank among the states was first,—a position held since 1820. In 1892 a state census was taken, which gave the population at 6,513,344. The density of population in 1890 was 125.95 to the square mile; that of 1880 was 106.74. The census reports of 1890 give 46 cities in the state with a population of 8,000 or more, in which resided 3,599,877 persons, constituting 60.02 per cent of the entire number of inhabitants. In 1880 the number of cities of the population stated above was 33, in which resided 2,591,267 persons, 50.98 per cent of the residents of the state. The relative number of males and females in 1890 was 2,976,893 of the former and 3,020,960 of the latter. The native-born population at the time of the taking of the last decennial census was 73.81 per cent; the number of negroes 70,092,—an increase from 1880 of 4,988; the foreign-born citizens numbered 1,571,050. Of this latter class there were representatives of almost all nations of the earth. The Germans numbered 498,602, the Irish 483,375, the English 144,060, the Canadians 93,193, the Italians 64,147, the Russians 58,466, the Scotch 35,332, the Austrians 33,145, the Swedes 28,430, the Poles 22,718, the French 20,443, the Hungarians 15,598, the Bohemians 9,129, the Norwegians 8,602, the Dutch 8,366, the Welsh 8,108, the Danes 6,238, the Chinese 3,135.

The agricultural interests of New York are many and varied. As a producer of cereals the position occupied in 1890 was that of nineteenth as to area and fifteenth as to production. The total acreage under cereals was 3,239,466, or 10.63 per cent of the total land surface of the state, and the production in bushels 78,272,587. Of the whole area, 15.23 per cent was under corn, 14.28 under wheat, 43.75 under oats, 10.78 under barley, 7.31 under rye, and 8.65 under buckwheat. The acreage and product of the above-named crops is given below:

	ACREAGE.	RANK.	BUSHEL.	RANK.
Indian corn -----	493,320	26	15,109,969	21
Wheat -----	462,561	21	8,304,539	17
Oats -----	1,417,371	8	38,896,479	9
Barley -----	349,311	5	8,220,242	5
Rye -----	236,874	3	3,065,623	3
Buckwheat -----	280,029	1	4,675,735	1

During the period 1880 to 1890 the number of acres of meadow-land mown for hay was increased in New York by 598,558 acres; 48,954 horses were foaled; the average weight of fleeces sheared from sheep increased from 5.15 to 5.66 pounds; the num-

ber of milch cows was increased by 2,375, giving the state more milch cows than any other three states in the North Atlantic division; the number of neat cattle on farms was decreased by 208,364,—the largest loss of any state in the Union during the time, but leaving almost fifty cattle to each square mile of land surface; the average milk-production per cow during the period was 460.98 gallons,—the second highest production in the United States. New York stood high in the production of both flaxseed and fiber, ranking second in the av-



STATE SEAL OF NEW YORK.

erage value per acre of all flax products. In 1880 the state produced considerably more than one half of the total fiber raised in the United States. The highest average production of hemp to the acre in 1889, 1,192 pounds, was in New York, which stood second in the average value per acre, seventh in acreage, and fifth in production. In the area devoted to tobacco in the same year, New York stood eleventh, with 8,629 acres, and in production stood tenth, with 9,316,135 pounds raised. In the production of hops, New York led all the other states by far in the census reports of 1890, its hop acreage being more than seven times, its hop-production more than two and two fifths times, and the value of its hop crop more than two and three fifths times that of any other state. Below are given the relative statistics of farms, acreage, values and products for 1880 and 1890:

	1880.	1890.
Total number of farms -----	241,058	226,223
Average size of farms, acres -----	99	97
Total acres in farms -----	23,780,754	21,961,562
Total acres in farms, improved -----	17,717,862	16,389,380
Total acres in farms, unimproved -----	6,062,892	5,572,182
Total value of farms, fences, buildings, implements, machinery and live-stock -----	\$1,216,637,765	\$1,139,310,716
Total value of farm products -----	\$178,025,695	\$161,593,009
Number of horses -----	610,358	664,430
Number of mules and asses -----	5,072	4,636
Number of neat cattle -----	2,339,721	2,131,392
Number of swine -----	751,907	843,342
Number of sheep, excluding lambs -----	1,715,180	1,528,979
Pounds of wool shorn -----	8,827,195	6,715,686
Acres of meadow mown -----	4,644,452	5,243,010
Tons of hay harvested -----	5,255,642	6,675,658
Acres under Irish potatoes -----	340,536	357,464
Bushels produced -----	33,644,807	24,616,736
Acres devoted to hops -----	39,072	36,670
Pounds of hops produced -----	21,628,931	20,063,029
Pounds of broom corn produced -----	2,926,742	450,380
Bushels of pulse (peas and beans) -----	1,569,541	1,340,236

New York has stood first among the states since 1850 in the gross and net value of manufactured products, the average number of employees and the total wages paid. The total number of specified industries in 1890 was 65,840, the aggregate capital employed amounted to \$1,130,161,195, the number of employees averaged 850,084, to whom annual wages amounting to \$466,846,642 were paid, and the value of all products footed \$1,711,577,671. Among the leading industries were clothing in all branches, which approximated \$190,000,000; all lines of boots and shoes, \$36,000,000; furniture, all branches, \$29,000,000; hosiery, \$24,000,000; malt liquors, \$53,000,000; petroleum-refining, \$25,000,000; slaughtering and meat-packing, all branches, \$76,642,000; tobacco and cigars, all branches, \$51,853,000; all kinds of printing and publishing, \$68,800,000; lumber in all forms, \$50,000,000; leather in all forms, \$25,000,000; foundry and machine-shop products, \$72,000,000; bread and bakery products, \$33,000,000; and chemicals, \$20,000,000.

In the total value of the mineral products of 1889, New York stood sixth among the states, the output amounting to \$24,165,206. The iron ore amounted in value to \$3,100,216; all stone, to \$4,418,143, which included granite, marble, slate, limestone, sandstone, bluestone, millstones, mica and graphite. The petroleum product for the year was reported with that of the state of Pennsylvania, and the value given for the combined output of the two states as \$23,475,163. In the production of salt, New York is second only to Michigan, the report for 1889 giving the number of establishments at fifty, which is one fourth of the whole number in the United States; the capital invested, \$7,171,126, is more than one half of the total amount invested in the entire country; the number of employees was 1,245, their total annual wages, \$544,326; the value of the products for the year was \$1,563,228, that of the United States being \$5,484,618. Natural gas is largely used as a fuel for manufacturing purposes, and capital to the amount of almost one and one half million dollars is invested in its production. Fully one half of the cement made in the United States is manufactured in New York, the value of the annual product ranging from three million to four million dollars.

The timber-lands of the state were formerly very valuable, but great loss has resulted from waste and forest fires until the timber area is almost exclusively confined to the Adirondack region. The state forestry commission is doing much to preserve this district to the state, and legal protection has been thrown around the remaining forests of New York to a greater extent than in any other of the states.

The fishery interests of the state are of considerable magnitude, New York ranking fourth among the states in the census reports of 1890, the value of the catch of the preceding year being given at \$3,798,815. The number of persons engaged in boat or coast fishing was reported at

1,626, the value of the catch approximating \$1,000,000. The oyster-fisheries engaged 4,124 persons, and the value of the product was \$1,765,088. The menhaden-fisheries gave employment to more than 1,000 persons, and the value of the products exceeded \$600,000; in the shad and alewife fishery 1,190 persons were employed and \$597,059 represented the value of the products; in the inland fisheries 587 persons were employed, and \$82,412 was returned as the value of the products; the Great Lakes fisheries had 634 persons engaged, and yielded a return of \$165,116, while many persons were engaged in and large returns came from cod and ground fishery, lobster-fishery and whale-fishery. Much attention is given to the fisheries of the state, and the legislature makes liberal appropriation for the distribution of fish and their protection. In 1894 a total of 134,000,000 fry were placed in the different waters of the state, and during the year ending Sept. 30, 1895, 196,247,840 fish of various kinds and ages were planted by the state. The kinds of fish distributed are many, including the brook, brown and rainbow trout, landlocked and sea salmon, maskalonge, black-bass, whitefish, pike, perch, tomcod, smelts, sciscoes, shads, bullheads, frost-fish and pike-perch.

Game is also protected by vigorously enforced laws, and has multiplied very rapidly within the period 1890-96. In the Adirondack region over 5,000 deer were reported killed in the open season of 1895.

The state taxes for 1895 were levied on a basis of a total valuation of \$4,292,082,167. The total amount of property in the state was greater than the above sum by \$111,693,960, corporate personal property not subject to taxation locally for state purposes. The total wealth of the state was divided as follows: Real estate, \$3,841,582,748; personal property, \$592,193,379.

The comptroller of the treasury reported on Oct. 1, 1895, that there was in the treasury the sum of \$811,762; the receipts during the year from all sources amounted to \$19,630,121, and the expenditures of the year amounted to \$20,366,646. The balance on hand at the beginning of the fiscal year was \$1,548,286, which, with the receipts of the year, sufficed to meet the expenditures and leave the balance in the treasury above mentioned,—the smallest balance remaining at the close of a fiscal year since 1890. The different corporations doing business within the state paid in during the year the sum of \$1,855,975, which, with the organization taxes received, amounted to a total of \$2,115,807. During the fiscal year 1,423 new corporations were formed, which paid in, as taxes, the total amount of \$492,495.

The state charitable, reformatory and penal institutions of the state are many and well sustained. The asylums for the insane number eight, and are located at Utica, Poughkeepsie, Middletown, Buffalo, Willard, Binghamton, Ogdensburg and Rochester. The original cost of the buildings alone was \$8,509,271. In 1895 the legislative appropriation for the care of the insane

amounted to \$4,292,082. At Syracuse is maintained an institution for the care of feeble-minded children, and at Newark one for feeble-minded women. The blind of the state are educated at institutions located in New York City and Batavia, and for the deaf and dumb there are six institutions, located at New York City, Buffalo, Rochester, Malone, Albany and Fordham. State prisons are maintained at Sing Sing, Auburn and Clinton; the average total number of convicts being about 4,000. At Auburn separate buildings are provided for women convicts, and reformatories are provided for women at Hudson and Albion. For men there are reformatories at Elmira, Canaan Four Corners, Randall's Island and Rochester. At Matteawan is located a hospital for insane criminals, at Bath is a soldiers' and sailors' home, and at Rome is located a state custodial asylum.

In 1895 the biennial school census of all the villages and cities of the state exceeding 10,000 in population showed a considerable increase over the preceding census. In 1894 there were 11,121 schoolhouses, and during the year following more than \$4,000,000 was expended in building and repairs. The total number of persons of school age within the state was 1,932,295, of whom 1,208,855 belonged in the cities and 723,440 in the country. This was an increase of about 40,000 over the number in 1894. The total enrollment in 1895 was 1,124,998,—almost 42,000 greater than that of 1894. The total number of teachers in 1895 was 32,929, of whom 5,096 were males and 27,833 were females. In the cities of the state the teachers received, as salaries, \$7,264,613, and in the country \$4,788,404,—an increase over 1894 of \$169,922. The estimated value of all school property (buildings, sites, apparatus and furniture) was approximately \$50,000,000, divided among cities and country in the proportion of seven tenths to the former and three tenths to the latter. The average value of school property in cities was nearly \$55,000 and in country districts \$1,300. During the period from 1885 to 1895 the aggregate value of city school property had increased about \$15,000,000, and the country school property about \$4,000,000.

Teachers' institutes are held annually to the number of more than one hundred in various portions of the state, which are attended by an average of about 20,000 teachers. Normal schools are maintained at Buffalo, Courtland, Fredonia, Albany, Brockport, Geneseo, New Paltz, Oneonta, Oswego, Plattsburg and Potsdam, the aggregate attendance in 1895 being in excess of 8,000. The total value of the different properties is nearly \$2,000,000, and the annual expenditures approximate \$400,000.

The superintendent of public instruction, elected by the state legislature, is at the head of the common-school system of New York, under whose guidance work the superintendents in cities and commissioners over groups of towns. The regents of the University of the State of New York, elected by both houses of the legislature

on joint ballot, have supervision of education throughout the state. They supervise and control examinations, and have under their management the State Library and State Museum.

The following is a table of the denominational institutions of education conducted in New York, their location, and the religious organization under whose auspices they are operated:

LOCATION.	INSTITUTION.	RELIGIOUS DENOMINATION.
Alfred.	Alfred University.	Seventh-Day Bapt.
Allegany.	St. Bonaventure's Col.	Roman Catholic.
Anandale.	St. Stephen's College.	Protes. Episcopal.
Brooklyn.	St. Francis College.	Roman Catholic.
Brooklyn.	St. John's College.	Roman Catholic.
Buffalo.	Canisius College.	Roman Catholic.
Canton.	St. Lawrence University.	Universalist.
Geneva.	Hobart College.	Protes. Episcopal.
Hamilton.	Colgate University	Baptist.
Keuka College	Keuka College.	Free Baptist.
New York.	Col. of St. Francis Xavier	Roman Catholic.
New York.	Manhattan College.	Roman Catholic.
New York.	St. John's College.	Roman Catholic.
Niagara Univ.	Niagara University.	Roman Catholic.
Rochester.	University of Rochester.	Baptist.
Syracuse.	Syracuse University.	Meth. Episcopal.

The following is a list of the non-sectarian institutions of the state:

LOCATION.	INSTITUTION.
Brooklyn.	Polytechnic Institute of Brooklyn.
Clinton.	Hamilton College.
Ithaca.	Cornell University.
New York.	College of the City of New York.
New York.	Columbia University.*
New York.	University of the City of New York.
Schenectady	Union College.

The following are institutions for women only:

LOCATION.	INSTITUTION.
Aurora.	Wells College.
Brooklyn.	Parker Collegiate Institute.
Elmira.	Elmira College.
New York.	Barnard College.
Poughkeepsie.	Vassar College.

In 1890 there were, in New York, 8,237 church organizations, 7,942 edifices, a membership of 2,171,822, which was 36.21 per cent of the population, and church property of the value of \$140,123,008. In both membership and the value of church property the state ranks first, in number of edifices third, and in number of organizations fourth. The number of different denominations was 48, and there were 26 independent congregations. Leading among the denominations were the Baptists, all bodies, with 1,071 organizations; the Roman Catholics, 959; the Congregationalists, 301; the Jewish congregations, 179; the Lutherans, all bodies, 317; the Methodists, all bodies, 2,563; the Presbyterians, all bodies, 903; the Protestant Episcopalians, 735; the Reformed, 323; and the Universalists, 168.

In 1896, and for many years previous, New York stood first among the states in the strength

* Name changed from Columbia College, 1896.

and organization of its National Guard. Reports made in 1896 showed the actually organized force to consist of 730 commissioned officers, 12,159 infantry, 134 cavalry and 416 artillery. Additional troops of cavalry were formed in Brooklyn and Buffalo during the year. There was also a battalion of naval militia, numbering 344 officers and men, and 2 separate divisions of an aggregate strength of 100. The military force of the state is divided into four brigades, which include, in addition to the forces mentioned, signal and hospital corps. The state appropriations, including a permanent one for ordinary expenses of \$400,000, average close to half a million dollars annually. The Federal appropriation varies with the needs of the guard, amounting in 1894 to \$31,000, and having reached \$50,000.

At the time of the taking of the Federal census of 1850 there were but 1,361 miles of railway in the state of New York. In 1860 there were 2,682 miles; in 1870, 3,928 miles; in 1880, 5,991 miles; in 1890, 7,745 miles. Later reports have not been regularly made, but the mileage in 1895 was not far from 8,220. The time from 1890 to 1895 was not favorable for railway-construction, the greatest amount in any year being 99 miles of main line in the fiscal period ending June 30, 1894. The year 1895 showed an increase in net earnings over the year preceding of \$1,944,010. The funded debts of the various roads was decreased within the year mentioned by \$1,264,021, and the non-funded debt increased \$13,941,656. The average percentage of dividends declared during the year was 2.63, as against 2.69 in 1894.

The canals of New York, always the most important highways in states of the Union, began to receive legislative attention in 1893-94, and in 1895 a proposition was submitted to the voters of the state to issue bonds to the amount of \$9,000,000 for the purpose of improving the canals of the state by deepening and in other ways fitting them for greater traffic. This act was approved by a large majority of the voters of the state, and a tax, amounting to $\frac{13}{100}$ of a mill on each dollar of valuation of real and personal property in the state, is to be annually imposed for the purpose of meeting the maturity of the bonds and the annual interest thereon. The use of electricity as a motor for boats on the canals will, it is estimated, increase the traffic at least thirty per cent, and with the waterways deepened a revival of shipping interests is expected.

The report of the Commissioner of Insurance for 1895 shows that the total receipts of New York insurance companies for the year 1894 were \$161,714,963; of the companies of other states, \$94,909,514; the total disbursements of both classes of companies were \$177,863,333, of which sum \$116,054,725 was to policy-holders, and \$61,808,608 was to stockholders as dividends and for the cost of management.

In 1895 there were nearly 600 libraries in New York of 1,000 volumes and over each, containing an aggregate of nearly 4,500,000 bound volumes

and 500,000 pamphlets. Of these, about 250 were school libraries, 30 college, 100 public, and the remainder divided among legal, theological, college society, medical, government, state, social, scientific, V.M.C.A., public institution, garrison, mercantile and miscellaneous. The traveling library system originated in New York in 1893, when the Albany State Library officials resolved to loan boxes of from fifty to one hundred volumes each to such public libraries as needed them, and to communities where no libraries existed. The library remains in one place but six months, and is then returned to headquarters, to be followed, if desired, by another selection, while it is forwarded elsewhere. A small fee is paid by the borrowing library or town, sufficient to cover transportation charges and the wear of the books. Iowa, Michigan and Montana have followed the example set by New York, and the traveling library is now established by law in all of the states named.

The principal cities and towns of New York, with their populations according to the Federal census of 1890, and a state census taken in 1892, are given in the following table:

CITIES.	1890.	1892.
New York	1,515,301	1,801,739
Brooklyn	806,343	957,163
Buffalo	255,664	278,796
Rochester	133,896	144,834
Albany	94,923	97,120
Syracuse	88,143	91,944
Troy	60,956	64,986
Utica	44,007	46,608
Binghamton	35,005	34,514
Yonkers	32,033	31,419
Elmira	30,893	29,911
Long Island City	30,506	35,745
Auburn	25,858	24,737
Newburg	23,087	24,536
Cohoes	22,509	23,234
Poughkeepsie	22,206	23,196
Oswego	21,842	21,966
Kingston	21,261	21,495
Schenectady	19,902	22,858
Amsterdam	17,336	18,542
Jamestown	16,038	18,627
Lockport	16,038	16,088
Rome	14,991	13,638
Watertown	14,725	16,982
Gloversville	13,864	14,694
Middletown	11,997	11,612
Ogdensburg	11,662	11,959
Ithaca	11,079	13,460
Hornellsville	10,996	11,898
Hudson	9,970	9,633
Dunkirk	9,416	10,040
Corning	8,550	10,025

At the close of 1895 there were 207 state banks in New York, which reported, together with four private banks, assets and liabilities of \$271,448,300. Items of the liabilities were \$11,136,005 undivided profits, \$178,331,859 due depositors on demand, and \$16,148,856 surplus fund. The number of national banks was about 340, their combined capital nearly \$90,000,000, their surplus and profits about \$80,000,000, and individual deposits about \$400,000,000. There were, also, about 40 loan and trust companies, whose capital

stock would average almost \$1,000,000 each, and whose deposits would aggregate about \$350,000,000.

On Jan. 1, 1896, the newspapers published in New York numbered 1,949, of which 187 were daily, 4 triweekly, 44 semiweekly, 1,151 weekly, 10 fortnightly, 31 semimonthly, 475 monthly, 9 bimonthly, 1 six times a year, 1 five times a year, 35 quarterly and 1 semiannually. Papers were published in all of the 60 counties and in 477 of the cities, towns and villages, of which 63 are county seats.

The following is a list of the governors of New York from 1777, with their respective terms of office: George Clinton, 1777-95; John Jay, 1795-1801; George Clinton, 1801-04; Morgan Lewis, 1804-07; Daniel D. Tompkins, 1807-17; John Taylor, 1817; De Witt Clinton, 1817-22; Joseph C. Yates, 1822-24; De Witt Clinton, 1824-26; Nathaniel Pitcher, 1826-28; Martin Van Buren, 1828-29; Enos T. Throop, 1829-32; William L. Marcy, 1832-38; William H. Seward, 1838-42; William C. Bouck, 1842-44; Silas Wright, 1844-46; John Young, 1846-48; Hamilton Fish, 1848-50; Washington Hunt, 1850-52; Horatio Seymour, 1852-54; Myron H. Clark, 1854-56; John A. King, 1856-58; Edwin D. Morgan, 1858-62; Horatio Seymour, 1862-64; Reuben E. Fenton, 1864-68; John T. Hoffman, 1868-72; John A. Dix, 1872-74; Samuel J. Tilden, 1874-76; Lucius Robinson, 1876-79; Alonzo B. Cornell, 1879-82; Grover Cleveland, 1882-84; David B. Hill, 1884-91; Roswell P. Flower, 1891-94; Levi P. Morton, 1894. See also NEW YORK, Vol. XVII, pp. 450-457.

***NEW YORK CITY.** No city in the world changes faster in its methods of construction and appearance than the metropolis of the United States. An account of it up to the year 1884 may be found in Vol. XVII, pp. 457-466. From a city of broad, parallel north and south thoroughfares, intersected above Union Square at regular intervals by unusually broad cross-streets, and less than a generation ago monotonously built, it has gradually changed into a city of varied architectural splendor. There still remain the dingy and dismal tenement parts of the city. Lying chiefly south of Twelfth Street are sections confused and irregular, streets with old-fashioned houses, chiefly of brick, like Greenwich, fronting on the Hudson River, and, also above, thoroughfares, near the rivers, occupied by the monotonous tenements of wage-earners.

Architecture. But many substantial buildings, once considered imposing, in the very business section of the city have been pulled down to give place to immensely tall edifices of modern steel-construction. These tall buildings are scattered, at intervals, in great masses, like the Dakota and Navarro apartment-houses at the southwest corner of Central Park, or the New Netherland and Savoy hotels on the opposite eastern corner, and along Broadway and Madison Square southward. The most conspicuous region, however, of these gigantic structures is that near and below City Hall Park. The loftiest of these structures, in process of construc-

tion in 1896, faces on Park Row. The building is 27 stories in height, the cornices being 336 feet above the pavement. It has two flanking towers, finished with lanterns, the tops of which reach an altitude of 386 feet. The foundation extends 34 feet below the pavement. It stands upon piles capped with granite bedded in cement. It is 98 feet higher than the top of the cross that crowns the spire of Trinity Church. There are not less than four other office-buildings in the city which reach, with their domes or their ridges, a height of over 300 feet. They are the American Surety Building, at the corner of Broadway and Pine Street, 312 feet; the St. Paul Building, at the corner of Broadway and Ann Street, on the site of the old *Herald* building, 307 feet; the Pulitzer Building, on Park Row, the extreme height of which is 375 feet; and the American Tract Society, on Nassau Street, 306 feet in altitude. The immense cost of ground



MADISON SQUARE GARDEN BUILDING, NEW YORK.

in the denser parts of the city leads to this method of construction for office-buildings. Though much ingenuity has been expended by architects in designing these enormous structures, they are more appalling to the imagination than beautiful.

Far more elegant are the buildings of less altitude. Among these a conspicuous example of artistic success is the Produce Exchange, near Bowling Green, and commanding a view of the upper bay. It covers an area of 300 by 150 feet. The cornice is 116 feet above the street, and the top of the campanile, or tower, reaches 225 feet. It is built of brick and terra-cotta, in the modern Renaissance style, and the horizontal parts of the façade are distributed in four members, namely, the foundation story, two stories of round arched windows, each carrying a deep cornice; surmounting all, a superstructure finished in a series of continuous small round arches, and having the effect of a balustrade.

One of the most beautiful buildings in the city is the Madison Square Garden, which occupies the entire block, along Twenty-sixth Street, from Madison Avenue to Fourth Avenue. It is built of buff brick with harmonized terra-cotta trimmings, has an Italian tower rising to a height of three hundred feet, and bearing aloft, at the peak of a minaret above its lantern, a gilded statue of Diana. An open colonnade, covering the sidewalk, with a balconied roof, surrounds the lower story. Above the heavy cornice which finishes the Roman main story rises a lighter arcade or cloistered gallery. At the corners are small lantern-towers. This building is devoted entirely to amusements. It contains an amphitheater of thirty thousand square feet, available for fairs and exhibitions. Within it twelve thousand people can be assembled. It has also a theater, concert-hall, roof-garden and a restaurant, and is entirely fire-proof.

Always notable for the magnificence and extent of its hostelry as the city is, the Hotel Waldorf, at Fifth Avenue and Thirty-third Street, is architecturally most imposing. It is a red-brick structure, with embellishments of terra-cotta, and in its grandeur renders insignificant the old hotels, like the Fifth Avenue and the Hoffman House, once considered palatial. The Holland House, the Windsor, the Plaza and the Park Avenue hotels are of simpler design, imposing in appearance and enjoying the most expensive patronage; while the Hotels Netherland and Savoy, lofty structures of gray material, cannot be excelled for the opulent effects of their interior finish. Open balustraded staircases, often with balconies at their landings, rise from a cluster of office-rooms and converging corridors, with fretted ceilings and pilastered walls, dadoes and mosaic pavements, all of polished variegated stones.

Among other recent works of art is the Washington Arch, at the foot of Fifth Avenue, at the north entrance to Washington Square. It is of pure white marble, in the Roman triumphant style, and consists of a single arch, with pedestals at the base for the reception of statuary. The arch, above its piers, which are plain, is highly enriched with emblematical and decorative carving in relief.

The Grant Tomb, at the summit of the Riverside Park bluff, overlooking the Hudson River, was brought to completion in 1896, except as to its accessory embellishments. It is reached from the river by a broad flight of granite steps. The main structure is square, with a projecting Greek porch, intended to supply a background for equestrian statues of Grant and his generals. Within is the crypt which contains the body. It is surmounted by a circular tower, of which one member is a Greek arcade. Above it rises a clear story, ending in a conical roof.

Parks. Notwithstanding the space-restrictions of Manhattan Island, the city has been prodigal in the establishment of parks. Topographical reasons have had something to do with their recent laying out. The highest point in the city is at Washington Heights, 184 feet above the level of the river. The Heights, with their long southern spur, are a precipitous ridge overlooking the Harlem flats on

the east and the Hudson River on the west. The work of reducing these escarped sides to building-grades would have been enormously expensive. The city has taken sections of these declivities and subjected them to landscape-gardening with terraces. The most conspicuous of these parks is the Riverside, two and a half miles long, and only five hundred feet wide in its widest portion. It is the bank of the Hudson River, at the summit of which a low stone wall separates it from one of the most beautiful drives of the city. The Trinity Church burial-ground and Audubon Park lie still farther north, on the river bank. Morningside Park, stretching from One Hundred and Tenth to One Hundred and Twenty-third Street, is another of these hillside embellishments,—a narrow, irregular triangle. Overlooking it, and including the old Bloomingdale Asylum, are the sites of the new St. Luke's Hospital, the Protestant Episcopal Cathedral



WASHINGTON ARCH, NEW YORK.

of St. John the Divine, in 1896 under process of erection, and the new buildings of Columbia University and the Teachers' College. This is destined to be one of the most beautiful parts of the city. In recent years, the Park Commission has turned its attention to the East Side, and furnished breathing-spaces to the congested population there. At the south lies Jeanette Park, a recently opened space at Coenties Slip; Five Points Park, at Mulberry Bend, in the midst of a motley foreign population; still another at Corlear's Hook, overlooking the East River from the north; and a fourth at Avenue B and north of East Eighty-fourth Street, opposite the upper end of Blackwell's Island.

In addition to these, the Dock Commissioners have covered some of their piers on the North River, so as to create there roof-gardens, chiefly for the use of people occupying tenements along the river borders.

North of the Harlem River, the city has acquired

3,843 acres for park purposes, at a cost of about ten million dollars. Van Cortlandt Park, adjoining the Yonkers boundary, contains 1,069 acres, and is the scene of state military encampments, but as yet it is comparatively unimproved. Bronx Park, on the river of that name, in the Twenty-third Ward, contains 653 acres, and is destined to be the location of a botanical garden of 250 acres, on both sides of the river, to cost \$750,000, of which a third was raised in 1895 by subscription, the rest coming from municipal bonds.

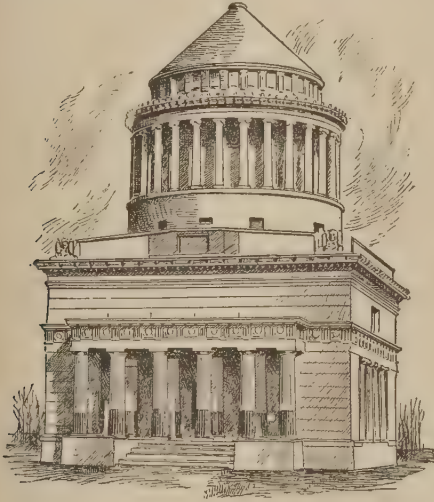
Pelham Bay Park, in the eastern corner of the Westchester annexed district, fronts upon Long Island Sound and contains an area of 1,700 acres. The banks of the Harlem River, extending from Washington Bridge northward, are also reserved for park-spaces and driveways.

Monuments. There are more than fifty monuments, some allegorical, some portrait-commemorations of illustrious men, scattered through the parks and open spaces of the city. One of the finest of recent erections is the Columbus Monument, at the corner of Eighth Avenue and Fifty-ninth Street, one of the most effective monumental positions of the city, Central Park lying to the north of it. It is of white marble, and consists of a lofty column surmounted by a colossal figure of Columbus. Allegorical figures are at the pedestal and base of the column. It was unveiled in 1892.

Among other monuments unveiled since 1883 are the colossal effigy of Liberty Enlightening the World, on Bedloe's Island, in the upper bay (see BARTHOLDI and BEDLOE'S ISLAND, in these Supplements), dedicated in 1886; a bronze bust of Beethoven, Central Park (1884); equestrian statue of Simon Bolivar, at the West Eighty-first Street entrance to Central Park; bronze statue of Roscoe Conkling, at Madison Square (1893); the letter-carriers' commemorative statue, in bronze, of S. S. Cox, in Astor Place; a statue of William E. Dodge, a New York philanthropist and merchant, at Thirty-sixth Street and Broadway (1885); Garibaldi, in Washington Square (1888), presented by the Italian Society; two statues of Horace Greeley; a bronze of Nathan Hale, the Revolutionary martyr-spy, in City Hall Park (1893); an equestrian statue of General Winfield S. Hancock, near the northern end of Central Park; a bronze of Dr. James Marion Sims, in Bryant Park; one of Thorwaldsen, at the Sixth Avenue entrance to Central Park; and one of John Ericsson, commemorating, on a panel, the fight of the *Monitor* and *Merrimac*, at the Battery (1893).

Bridges. The Harlem River is crossed by 13 bridges, several of them being railway structures. Of the architectural bridges, the High Bridge, in the service of the Croton Aqueduct, and the Washington Bridge, crossing the river in two spans, are well-known structures. A new bridge, completed in 1895, at a cost of about two million dollars, leads from Eighth Avenue to Central Avenue, on the way to Jerome Park. It is 66½ feet wide, is the largest drawbridge in the country, and the bridge proper has a length of 1,920 feet. On the south side it is connected with Washington Heights, at One Hundred and Fifty-fifth Street, by a viaduct

69 feet above the elevated railway. It is an iron and steel structure, with asphalt sidewalks and roadways. Another suspension-bridge is in contemplation between New York and Brooklyn. A tunnel has also been driven under the East River, near Blackwell's Island. By act of Congress passed in 1895, an immense suspension-bridge was authorized to be constructed across the Hudson River, having its eastern abutment between Fifty-ninth and Sixtieth streets. It is to be a grand thoroughfare for the railroads, the termini of which are now on the New Jersey side, and will have a roadway of six pairs of tracks for steam trains at one altitude and one for horses and foot-traffic at another. The maximum length of span to be considered is 3,110 feet; the height above flood-water at the center is to be 150 feet. The main towers will be 587 feet high, over which 12 cables are to pass. The law provides that the bridges must be completed in ten years. The Union Bridge Company, which has the matter in charge, expects to complete it by 1900, at an estimated cost of about twenty-five million dollars.



GENERAL GRANT'S TOMB. (See pp. 1444 and 2201.)

Greater New York. Under a commission appointed in 1890, by the legislature, a project was brought forward to consolidate Brooklyn and adjoining districts with New York under one municipal government, known as Greater New York. In 1894 a bill was passed defining the limits of the proposed consolidation, and submitting the unification to the popular vote of the districts involved. Under this act, Greater New York is to consist of the present city, Long Island City, the county of Kings (which includes Brooklyn), Richmond County (Staten Island), the towns of Westchester, Flushing, Newtown, Jamaica, and those parts of East Chester and Pelham which lie south of a straight line drawn from a point where the northerly line of the city of New York meets the center of the Bronx River, to the middle of the channel between Hunter's and Glen Islands, in Long Island Sound, with a portion of the town of Hempstead, on Long Island. This would include an area of 359.75 square

miles. The consolidation was approved by a small majority of the people, when submitted to them, but their action was not confirmed until 1896, when the legislature gave effect to the popular will, and directed a commission to draw up a charter for the common government.

Educational. There were, in 1896, 53 general and special libraries in the city of New York, the law and medical libraries being especially rich in rare and authoritative books. Two of the greatest libraries of the city, the Lenox and the Astor, were consolidated with the Tilden fund in 1896 (see TILDEN LIBRARY, in these Supplements), and the city granted the new organization the site of the old reservoir in Bryant Park for the new building.

The school system is under the control of 21 commissioners, appointed by the mayor, but there are subordinate district boards in charge of local matters. The system is complex and unsatisfactory. In 1894 there were 331 schools under its jurisdiction. The number of pupils registered was 184,381, and, according to the school census, the total number of children was 423,164; average attendance, 174,101.

In 1896 a site was secured at Manhattanville, One Hundred and Thirty-eighth to One Hundred and Fortieth streets, between Amsterdam and St. Nicholas avenues, for the removal thither of the College of the City of New York from Lexington Avenue and Twenty-third Street. This college for young men, and the Normal School at Sixty-ninth Street and Park Avenue for young women, are the highest schools of the public system. They are free, and each has about fifty instructors and an attendance of sixteen hundred pupils. The college received, by act of legislature in 1895, the sum of \$600,000 for the purchase of a new site and \$575,000 for the erection of buildings. The same year, the city, which already had on hand \$1,500,000 available for the purpose, was authorized to borrow \$5,000,000 for the erection of school edifices.

Finances. The outstanding funded debt of the city of New York, Dec. 31, 1895, amounted to \$188,153,107.86. The tax rate for that year was \$1.91 per cent, as compared with \$1.79 for 1894. The annual income from taxation was estimated and apportioned by a Board of Estimation and Apportionment, which allowed for municipal improvements and the expenses of government the sum of \$46,496,571.31 in the year 1896, of which nearly \$44,000,000 is from taxation. The wealth of the city is in the charge of a county board of three tax commissioners, who reported the total value of real and personal property, as assessed for taxation in 1895, to be \$2,016,947,662.

Public Works. The department of public works is in the charge of a commissioner appointed by the mayor. The revenue from the water service was \$3,232,320. During the year 7¼ miles of new sewers were built, making a total of 468 miles of sewer, on Manhattan Island; 326,500 square yards of new pavement were laid; 124,000 square yards of macadam roadways repaired; 981 new gas-lamps and 122 new electric lamps were lighted, giving a grand total of 29,306 lamps of all kinds in the city.

The public works undertaken during the year consisted of the widening of College Place, at an

estimated cost of one million five hundred thousand dollars.

Aqueduct Commission. The water-supply of New York is in the charge of a commission consisting of the mayor, comptroller, commissioner of public works and four special commissioners. A second conduit of the Croton system, having a diameter of 12 feet, was completed in 1890, at a cost of \$25,000,000, and the water-supply of the city is unsurpassed. The present work of the commission is concerned with the extension of the storage system. Titicus Dam, near Purdy's Station, in the northeast of Westchester County, was completed at a cost of nearly \$1,000,000, and 4,000,000,000,000 gallons of water were stored in the adjacent reservoir. The Carmel dams were finished at a cost of \$558,241.64, and will contain 10,000,000,000,000 gallons. Work was begun in 1892 on the construction of the Croton dam,



COLUMBUS MONUMENT, NEW YORK.

behind which the storage-capacity is 32,000,000,000,000 gallons, making a total storage of water for the city of New York of 70,000,000,000,000 gallons. The Jerome Park reservoir, begun in 1895, is estimated to require seven years for its completion. The contract cost is \$5,473,060. The daily consumption of water in the city in 1895 was 200,000,000 gallons.

The Building Department of New York is under the control of a commission, who received 2,029 plans for new buildings in the year 1895, at an estimated cost of nearly seventy-eight million dollars, and 1885 plans for alterations, at a cost of nearly nine million dollars.

Vital Statistics. The Board of Health consists of the president of the Board of Police, the health-officer of the port and two other commissioners, one of whom must have at least five years' standing as a

practicing physician. The death rate for 1895 was 23.15 per 1,000. The Board of Health is also charged with the regulation of food-inspection and offensive trades.

Street-Cleaning. The department of street-cleaning is under the charge of a commissioner, and in 1895 \$2,069,926.99 was expended for the purposes of the department, with nearly \$500,000 for removing snow and ice and purchasing new stock.

Docks. A department of three commissioners has charge of the city docks, and in 1895 constructed 3 new piers and 245 feet of bulkhead. The revenues of this department were \$2,025,527.45 for the year 1895, as against an expenditure of \$995,262.42.

Police. The department of police is in the charge of four commissioners, appointed by the mayor for the term of six years. The police force of the city of New York consists of about 4,000 men, all told, the city being divided into 35 precincts, each commanded by a captain. Many of the men on duty in the north part of the city are mounted, while the harbor police form a separate precinct, the twenty-fourth, and patrol the river margin in rowboats, with headquarters on the steamer *Patrol*. In summer a steam-boat squad is detailed to accompany all pleasure-boats plying to suburban and seaside resorts. The Broadway squad is a picked body of exceptionally tall officers of fine appearance, who are assigned to day posts on the broad thoroughfare.

Fire Department. This department is under the control of a board of three commissioners, holding office for six years. On Jan. 1, 1896, the force consisted of 1,359 officers and men, 59 engine companies, including three fireboats, 22 hook and ladder companies, 98 steam fire-engines, 4 water-towers, 39 hook and ladder trucks and 416 horses. During the year there were 3,940 fires, with an estimated total loss of \$3,155,431, on which the insurance was \$77,361,413.

Manufactures. The returns of the census of 1890 placed New York first among American cities in the number of its manufactures and the value of their production. Yet an examination of the list will show a remarkable absence of the products of textile mills and iron-works, these being found in towns where mill sites are less expensive. By that census there were 25,403 establishments enrolled, having a capital and hired property aggregating \$640,946,076, employing 354,291 workers, who received \$230,102,167 in wages, while the total value of their productions was placed at \$777,222,721.

The following list gives the branches of manufacture, in the order of their importance according to their productive value, from \$5,000,000 upward:

Clothing, men and women, \$138,338,580; book-making, printing and publishing, \$90,780,758; slaughtering and meat-packing, \$50,251,504; tobacco manufactures, \$35,560,025; malt and malt liquors, \$26,046,721; foundry and machine-shop products, \$19,543,794; furniture, \$15,661,491; bread and baking, \$15,004,542; silk and silk goods, \$13,579,462; boots and shoes, \$13,088,672; millinery, \$12,873,387; gas, \$12,672,963; paper-hanging and painting, \$11,000,675; fur goods, \$10,663,997; plumbing and gas-fitting, \$10,304,253; boxes of wood or paper, \$9,885,421; marble and stone work, \$9,459,394; furnishing goods, men's, \$9,362,394; engraving and lithographing, \$8,868,739; shirts, \$8,401,216; lumber products, \$8,165,131; flour

and grist mill products, \$8,098,430; jewelry and silverware, \$8,008,265; artificial feathers and flowers, \$7,953,065; hats and caps, \$7,583,402; lard, \$6,615,452; tinsmithing, \$6,191,177; chemicals and drugs, \$5,912,324; soap and candles, \$5,518,663; iron-work, ornamental, \$5,502,303; and umbrellas and canes, \$4,905,532.

Miscellaneous. Plans advocated for securing rapid transit involve two systems,—one increasing the capacity of the elevated railways by means of two-storied tracks, one being reserved for express trains; the other comprising an immense subway from Whitehall to One Hundred and Sixty-ninth Street, with a branch from Union Square for the accommodation of the East Side, at an estimated cost of \$50,000,000, but in 1896 no settlement of the problem had been made.

The greater portion of the immigration into the United States passes through the port of New York. In 1895, of 279,946 immigrants, 219,006 landed in the port of New York. Under the old system, the State Board of Immigration took charge of the matter, and Castle Garden was used for the reception of immigrants. In 1891, however, the United States assumed control, abandoned Castle Garden, and established a new depot at Ellis Island, just north of the Liberty Statue. Hither all steerage passengers are transferred from the steamers in which they arrive, and here they are detained until examined and recorded. A ferryboat runs between the Battery and the island every forty minutes, during working-hours, and visitors are admitted to the galleries overlooking rooms in which the immigrants await registration.

The Excise Department, under the control of three commissioners, in 1895 had a revenue of \$1,790,530, derived from 11,029 licenses, including transfers. Its working expenditure was \$134,290.27. But in 1896 the passage of the Raines Law put an end to the system of licenses, and transferred the control of the liquor traffic to the state. (See LIQUOR LAWS, in these Supplements.)

Under authority, and with the appropriations of Congress, the Harlem ship-canal was built, and on June 17, 1895, was opened with a grand pageant, in which the navy of the United States participated. The canal was several years in construction, and cost \$2,700,000. It is a mile long, and connects the navigable part of the Harlem with the Hudson River, along the line of Spuyten Duyvil Creek. As finished, the canal is 400 feet wide and 15 feet deep, and has upon it a cutting 1,100 feet long, through Marble Hill, where the depth of 21 feet was excavated, in contemplation of a future dredging of the approaches on either side to an equal depth.

The commerce of New York is the first to feel the fluctuations of hard or prosperous times. Very steadily, the city exports about 45 per cent of the produce and other merchandise shipped from the United States, while 65 per cent of the total imports of the country come into this port. In the fiscal year ending in 1895, of the \$152,158,617.45 collected as customs by the Treasury Department of the country, \$87,082,610 was received at the port of New York.

In 1895 there were, in the city, 51 national banks, with a capital of \$52,150,000, and 41 state banks, with a capital of \$13,972,700. The daily exchanges of the clearing-house average nearly \$98,000,000. At the same date there were, in the city, 25 savings banks, holding \$365,859,453 in deposits, and \$41,850,431 surplus.

The population of New York in 1890 was 1,513,501. Estimated by the number of voters registered in 1896, it was then 1,900,000. On the same basis of calculation, the inhabitants of the area set off to Greater New York must have been 3,500,000, in round numbers.

Historical. In 1883 the Brooklyn Bridge was formally opened to traffic. Two years later, Aug. 8th, the remains of General Grant were escorted to the mausoleum in Riverside Park by an imposing civic, military and naval procession. A three-days' celebration of the inauguration of George Washington as first President of the United States occurred April 29 to May 1, 1889. On April 26, 1893, a grand pageant began in commemoration of the discovery

of America, and as the opening of the Columbian Fair fêtes. Twenty-three naval vessels from nine foreign countries were escorted, with military salutes, by twelve United States cruisers and monitors moving in double column from the upper bay to anchorages in the Hudson River, opposite the city. The next day President Cleveland and his suite reviewed them from the steamer "Dolphin," passing between the lines and receiving the national salute from each vessel as he passed, until the "Dolphin" came to anchor near the Spanish caravels at the head of the line. On the 28th there followed a civic, military and naval parade. In 1894 the city was agitated by the revelations of the Lexow investigating committee, disclosing the corruption of the municipal government. (See LAW AND ORDER SOCIETIES, in these Supplements.) The indignation aroused led, in the following autumn, to a combination of men of all parties to redeem the city from the malign influence of Tammany Hall. The elections resulted in a sweeping victory for all the men named on the ticket of the reforming Committee of Seventy, of whom W. L. Strong was candidate for mayor. On Mr. Strong's accession, the legislature strengthened his hands by conferring large power to remove from office; the police department was reorganized under a new board of commissioners, and the Raines Liquor Law broke the hold of political organizations upon saloons. In the Presidential elections of 1896 the city of New York failed, for the first time in fifty years, to give a majority to the Democratic ticket, and its voice, by a plurality of twenty thousand, was for William McKinley as President of the United States.

D. O. KELLOGG.

NEW YORK, UNIVERSITY OF THE CITY OF, an institution for the education of men, chartered in 1831, located in New York City. It has been governed since 1883 by a board of private trustees. Previous to that time five members of the board were elected by the city. The university consists of three departments: The Faculty of Arts and Sciences, which includes the undergraduate and graduate collegiate courses, the Department of Medicine, commonly known as the University Medical College, and the Department of Law. The original building was erected in 1832, on Washington Square. A new structure was erected in 1894, in which are placed the School of Law and the graduate and pedagogical departments. The undergraduate work is carried on at Two Hundredth Street, where, in 1892, new buildings were erected, near the Harlem River. The medical department is situated on Twenty-sixth Street, near Bellevue Hospital. There were, in 1895, in all the departments, 975 students and 127 instructors. The university possesses a library of 31,000 volumes. From the organization until 1896 there were graduated 12,500. The university has productive funds to the amount of \$900,000, and an income of about \$135,000.

NEW YORK, UNIVERSITY OF THE STATE OF, a very remarkable institution, and the only body of the kind in the United States. It is the term applied to the governing body which controls all

schools of higher education, libraries and museums in the state of New York. The elementary schools and high schools are under the supervision of the state superintendent of public instruction, whose duties are similar to those of the like officer in all states of the Union. The governing body of the University of the State of New York consists of a board of regents, who are elected by a joint ballot of the legislature. All higher schools, including technical colleges, theological, law and pedagogical schools, are controlled by this board, and are obliged to secure their charters through it. The power of the board is absolute, and includes in its scope the financial management of the institutions. Regular examinations are held under the authority of the board, and University Extension work is controlled by it. The University of the State of New York is an outgrowth of the opposition of the county districts to the control of the state educational interests by New York City. This opposition was engendered by the feeling of the patriot farmers, that the colleges of the city were under the control of Tory sympathizers.

NEW ZEALAND. (For the general article, see *NEW ZEALAND*, Vol. XVII, pp. 466-471.) The report of 1895 made the area 104,471 square miles.

The North Island is estimated to embrace an area of 44,467 square miles, the Middle Island 58,525, while Stewart's Island has an area of 665 square miles. The total acreage of the colony is 66,710,320, and up to the end of 1894, 21,088,018 acres had been alienated from the crown.

The total population, exclusive of aborigines, in 1891, the date of the census returns, was 626,658,—an increase since 1858 of 567,245, and an increase during the previous five years of 48,176.

The population of the North Island was 281,445; of the South Islands, including Stewart's Island, 344,913. The census of 1891 gave the total population as 668,651, including 41,993 Maoris. The total included 4,444 Chinese, of whom only 18 were females.

Of the Maoris, 22,861 were males, and 19,132 females. The total number includes 2,760 half-castes, living as members of Maori tribes, and 251 Maori wives of European husbands.

At the census of 1891 there were four towns with over 10,000 inhabitants in New Zealand; namely, Auckland, 28,613, or with suburbs, 51,127; Wellington (the seat of government), 31,021, or with suburbs, 33,224; Christchurch, 16,223, or with suburbs, 47,846; and Dunedin, 22,376, or with suburbs, 45,865. All the towns showed a small increase in population between the enumerations of 1886 and 1891.

GOVERNMENT. The system of government remains the same as described in Vol. XVII, p. 470.

The Legislative Council consisted, in 1895, of 44 members, nominated by the crown for life. By an act passed in 1887, the number of members to be elected to the House of Representatives was reduced to 74, including four Maoris, elected by the people for three years. The qualifications of electors are as follows: For Europeans of both

sexes, 21 years of age and upward, either a residence in the colony for one year and in the electoral district for three months immediately preceding registration, or possession of a freehold estate of the value of \$125; in the case of male Maoris, 21 years of age and over, enrollment as ratepayer, or possession of an estate worth \$125. No person may be registered on more than one electoral roll. Women cannot be members of either branch of the legislature. For Maori representation, every adult Maori resident in any Maori electoral district can vote, provided he (or she) be not registered on any European roll.

The general administration rests with a responsible ministry of seven members. The governor, appointed by Great Britain, receives a salary of \$25,000.

RELIGION. No state aid is given any religion. The principal churches in the colony are Church of England, Presbyterian, Roman Catholic, Methodist and Congregational. In 1891 there were but 3,928 pagans in the colony.

EDUCATION. The University of New Zealand is solely an examining body, granting degrees, awarding scholarships and exercising a general supervision over the colleges of the colony. There are three colleges under its jurisdiction, which had, in 1894, 680 students. In 1894 there were 24 secondary schools, with 166 teachers and 2,141 pupils. The primary schools are in charge of the Education Department. Of these there were, in 1894, 1,410, with 2,306 teachers and 127,300 pupils. School age is from 5 to 15, and between the ages of 7 and 13 education is compulsory in districts in which the compulsory act is enforced. There were 65 native schools, with 2,424 pupils. In addition, there are 302 private schools and medical, mining, agricultural, engineering, normal and art schools. There were, in 1891, 298 public libraries, with 330,770 volumes. In 1895 there were 52 daily papers, 64 weeklies, 28 semi-weeklies, 25 monthlies, and 16 published three times a week.

JUDICIARY. The administration of justice is in the hands of five supreme court judges, four district, and thirty magistrates.

INDUSTRIES. It is estimated that two thirds of the surface is suitable for agriculture and grazing. Twenty million acres were, in 1895, under forest. The total acreage under crop in 1895 was 10,128,076 acres (including sown grasses, and 140,494 just broken). There were, in 1891, 68,607 persons engaged in agriculture. The principal crops are wheat, oats and barley. There were, in 1891, 211,040 horses, 831,831 cattle, 18,227,186 sheep, 308,812 pigs, and 1,790,070 poultry. There were, in 1890, 2,570 factories with an estimated capital of \$29,134,880, and giving employment to 29,880 persons. These industries include packing establishments, tanneries, mills, saw-mills and iron-works. Gold, silver, antimony, manganese and coal are mined, and there are precious deposits of tungsten. In 1893 there was mined \$4,565,690 worth of gold and \$48,715 worth of silver.

FINANCE AND COMMERCE. In 1894 the imports amounted to \$33,940,100, and the exports to \$46,155,235. The total revenue for 1894 was \$21,650,495, and expenditures \$21,171,925. The registered vessels of the colony in 1894 numbered 475. On March 31, 1895, there were 760 miles of government railways in the North Island, and 1,233 in the Middle Island. The surplus earnings of the railways in 1894 were \$2,083,460. There are also 175 miles of private railways. The telegraph system is entirely in the hands of the government. The colony had, in 1894, 5,823 miles of line. The telephone is included in the telegraph department.

DEFENSE. The principal ports of the colony are defended by submarine mines, torpedo-boats, and heavy shore batteries. All males from 17 to 55 years of age are liable to serve in the militia. The volunteer force in 1895 had a strength of 7,368, while the available force in 1891 was 164,777.

NEZ PERCÉ INDIANS OR SAHAPTINS. See INDIANS, Vol. XII, p. 833.

NIAGARA, FORT, a United States military post, in the Department of the East, an inclosed work in Niagara County, western New York, commanding the entrance from Lake Ontario to the Niagara River, about 14 miles below the Falls. It has its own telegraph station, its railroad station at Lewiston, seven miles distant, and post-office at Youngstown. The reservation covers 228½ acres; and had, in 1895, 3 companies of infantry, with accommodations for 4 companies of infantry and 13 officers; has good water-supply from the Niagara River. During the War of 1812 Fort Niagara was a post of great importance, and was the scene of many stirring events. It was, in 1813, surprised and captured and most of its garrison slain.

NIAGARA FALLS, a village of New York, the principal settlement in the neighborhood of the falls, has several flour-mills, and sash and blind factories. The suspension-bridge connects it with the Canadian side, and there is also a bridge to Goat Island. Population 1890, 5,502.

NIAGARA FALLS RESERVATION. For some years prior to 1885, efforts were made by public-spirited persons to have the approaches to Niagara Falls, on the American side, made the property of the state, and free of access to all. Private interests of various kinds stood in the way of this project, and numberless petty extortions were practiced on the public. The legislature of 1884 passed a measure constituting a state commission for the appraisal and condemnation of the structures obstructing the bank of the river, which commission was also empowered to police the reservation when control should be obtained. July 15, 1885, was the day set for the final abolishment of the fee system and of the various hotels and shanties, and on that date the Niagara Falls Reservation, sometimes called the Niagara State Park, measuring 107 acres, at a cost to the state of \$1,433,430, passed into the keeping of the representatives of the people forever. A similar reservation, known as the Queen

Victoria Niagara Falls Park, on the Canadian side, and embracing about 150 acres, was authorized by the legislature of Ontario, and was opened to the public June 22, 1887.

NIAGARA FORMATION. See *Upper Silurian*, under GEOLOGY, Vol. X, p. 339.

NIAGARA POWER-PLANT. The water-power of Niagara Falls has long claimed the attention of engineers and capitalists. In 1873 a canal was constructed which gave 6,000 horse-power to several mills. The large amount of power going to waste, estimated by some at 7,000,000 horse-power, caused a number of residents of cities near the Falls to organize the Niagara Falls Power Company, chartered in 1886 by the legislature of New York. The first problem to be solved was the proper construction of the turbines and dynamos, as it was proposed to furnish electrical power. A commission was sent to Europe to study power-utilization. A conference of noted civil and mechanical engineers was held in London to discuss the problem. This conference was called the International Niagara Commission, and its method of procedure was to call for plans and ideas from any engineer. The best of these were adopted, and in 1890 the work was begun by the Cataract Construction Company. A tunnel 7,000 feet long, 21 feet high and 19 feet wide was dug, its construction occupying three years. At the same time a canal was constructed, 1,400 feet long, 110 feet wide at the upper end and 180 feet at the mouth. The water is carried from the river to the power-house by means of the canal, and carried away, after passing over the turbines, through the tunnel. There are 14 turbine-wheels, each supplied by a mill-race, and each capable of developing 5,000 horse-power. These turbines are located in a pit 178 feet deep, 140 feet long and 18 feet wide. In connection with each wheel is a dynamo of 5,000 horse-power. The power company obtained possession of two and one half square miles of land, on which have been erected various factories operated by the water-power. The electric current is carried to Buffalo, 18 miles distant, for supplying light to the city and running the machinery of the water-works system. Many private establishments in that city are also furnished with power. It is purposed to supply all adjoining manufacturing centers.

NIAGARA UNIVERSITY, a Roman Catholic institution for the education of men, located in Niagara County, New York, two miles N. of Niagara Falls. This institution was founded in 1856 as a seminary for the training of priests. It was changed to a general educational institution and received its charter from the state of New York in 1883. It includes, in its courses, full preparatory work, theological and general collegiate instruction and a course in medicine. In 1895 there were 240 students in attendance and a faculty of 44. The library, in 1895, consisted of about seven thousand volumes.

NIAS ISLAND. See SUMATRA, Vol. XXII, pp. 638-640.

NICARAGUA, REPUBLIC OF. (For geography, history and general description, see NICARAGUA, Vol. XVII, pp. 477-480.) The area, according to the reports of 1895, is about 49,200 square miles, with a population of about 380,000, the great mass of which consists of aboriginal Indians, mulattoes, negroes and mixed races, and a number of Europeans, who are on the increase, numbering, in 1895, about 1,200. There are 14 towns, with from 2,000 to 30,000 inhabitants. The seat of government is the town of Managua, situated on the southern border of the lake of the same name, with about 18,000 inhabitants.

A new constitution was proclaimed July 4, 1894. It vests the legislative power in a congress of one House, the members being elected for a term of two years by universal suffrage, and numbering 40. The executive power resides in a president, whose term of office is four years. He is assisted by a council of four responsible ministers, who have charge of the departments of Finance, Foreign Affairs and Public Instruction, Public Works, and Interior, Justice, War and Marine. June 20, 1895, a treaty was signed by the ministers of Nicaragua, Honduras and Salvador, providing for a union of the three republics under the name "Greater Republic of Central America." This treaty went into effect when it was ratified by all the legislatures, the last to do so being Salvador, May 6, 1896. This federation was intended as a step toward the reorganization of Central American states, and the confederation to be known as the "Republic of Central America." Each government is represented in a Diet, a body composed of two representatives from each republic. This Diet, besides having other functions, is empowered to settle all questions which may arise, touching the interests of the three nations.

The chief occupations of the inhabitants are cattle-raising and coffee-culture. There were about 400,000 head of cattle, and 98,000 acres were devoted to coffee culture, in 1892. Gold, silver and copper are mined. The chief export is coffee. The total imports in 1891 were \$2,738,500, and the exports \$2,376,500. Trade is increasing, and, with the deepening of the principal harbors and the construction of railways, it is expected that the volume of trade will be doubled. The Nicaragua canal (q. v., in these Supplements) will, when finished, make Nicaragua the great highway between the Atlantic and Pacific oceans. There were, in 1895, 2,100 miles of telegraph lines and 91 miles of railway. The railways are the property of the government. In 1892 the total revenue of the republic was \$1,764,037, and the expenditures \$2,983,576. The public debt amounted in 1894 to \$7,000,000. There were, in 1894, 1,020 schools, with 20,000 pupils. The active army consists of 2,000 men, and the militia of 5,000.

After the interference of Great Britain with the native government of the Mosquito Reserve, and the consequent objection of Nicaragua, the Mosquito Indians, by voluntary action, were incorpo-

rated as the thirteenth province of Nicaragua, Nov. 20, 1894. In these troubles the Nicaraguan forces had expelled from the Mosquito territory the British pro-consul. For this act Great Britain presented, Feb. 26, 1895, a formal demand for an indemnity payment of \$375,000. Other demands were made for private redress, in favor of British subjects expelled and British vessels seized. Nicaragua demanded arbitration, but Great Britain presented an ultimatum demanding immediate settlement, with a threat of the seizure of the Pacific port of Corinto, in case of non-compliance. Nicaragua expected United States interference, but that was refused, on the ground that in the expulsion of its pro-consul Great Britain had just cause for complaint. April 22d a British fleet entered Corinto harbor, and April 27th the British took possession of the port. May 4th the troops were withdrawn, Nicaragua, persuaded by the United States and Salvador, agreeing to pay the indemnity.

NICARAGUA CANAL. Early in the present century the possibilities of a canal from the Pacific Ocean to the Atlantic side of Central America, through the state of Nicaragua, were realized. The first charter granted to a company formed to construct such a canal was in 1849, and is known as the "Vanderbilt concession." This company failed to carry out its plan, and the project, with intermittent agitation, was not revived until April, 1887, when the government of Nicaragua granted a charter to the New York Nicaragua Canal Association, and on Feb. 20, 1889, the United States Congress chartered the Maritime Canal Company. A Nicaragua Canal Construction Company undertook to do the actual labor of the undertaking. From Oct. 8, 1890, until September, 1891, \$2,000,000 were expended, and during the next year \$2,000,000 more. The company, in 1891, realizing the great burden of the undertaking, caused a bill to be introduced in Congress providing for government supervision and the appropriation of \$100,000,000. This bill failed to pass. In 1892 the Senate passed a bill with almost the same provisions, but the House of Representatives refused to act. In the mean time various private companies, both American and foreign, were organized, but no further expenditures were made. Congressional legislation being again agitated, in 1895 the President appointed a commission of three engineers to examine the work already done and to report upon the feasibility of the undertaking. This commission reported in November, 1895, and gave as the result of its investigations, that a final judgment could not be given without a complete survey of the district being made; that the Nicaragua route is the best for an inter-oceanic canal in Central America, but that the plans and surveys made are poor, and new ones should be made. It recommended that a government survey be made and a year and a half be allowed the survey to complete its work. This report was submitted to Congress, Feb. 7, 1896. The party platform adopted by the Republican convention in 1896 urged the completion of the

canal by the government. For a description of the survey and engineering details, see CANAL, Vol. IV, pp. 793, 794; and CANAL in these Supplements.

NICCOLINI, GIOVANNI BATTISTA, an Italian poet; born in the Bagni di San Giuliano, Oct. 31, 1782. In 1804, on the occasion of the plague at Leghorn, he wrote a beautiful poem entitled *La Pictà*; then followed his tragedies, *Polissena*; *Medea*; *Edipo*; *Ino e Temisto*; *Matilda*; and the translations of the *Seven from Thebes* and of the *Agamemnon*. For some time he was professor of history and mythology in Florence, and for a short while librarian of the palace. His most successful works are *Nabucco*, an allegorical tragedy; *Antonio Foscari*, and his revolutionary drama, *Giovanni da Procida* (1830); *Filippo Strozzi* (1847), containing a representation of the fallen, yet not hopeless, state of Italy. He died at Florence, Sept. 20, 1861.

NICENE COUNCIL. See COUNCIL, Vol. VI, pp. 510-512; also CREEDS, Vol. VI, pp. 559, 560.

NICHIREN, a Japanese Buddhist, and leader of one of the sects of that religion. He was born about A.D. 1222. He so aroused the strict Buddhists that in a number of instances they drove him out of the country. He taught that Buddha was not the superior being the old-school Buddhists believed him to be, but that every man, or living plant, can attain the greatness and divinity of Buddha by following the teachings of that saint. He also aroused anger by his assertion that man's salvation does not depend upon Buddha, but upon the conduct and life of the man himself. His teachings gradually obtained wide acceptance, and in modern times the Nichirens are the prevailing Buddhist sect in Japan. He died in 1282.

NICHOL, JOHN, a British littérateur; born in Montrose, Scotland, Sept. 8, 1833. He was professor of English literature at Glasgow University (1861-89), and contributed to the leading British reviews and to this ENCYCLOPEDIA. His article on AMERICAN LITERATURE, in Vol. I, pp. 718-735, has been published separately. He also published *Hannibal*, a drama (1872); *Byron*, in the English Men of Letters Series (1880); *Robert Burns* (1882); *Bacon*, in English Philosophers (1888); and *Lord Bacon's Life and Philosophy* (1889). He died in London, Oct. 11, 1894.

NICHOLAS II, Czar of Russia; born in St. Petersburg, May 18, 1868. He succeeded to the throne Nov. 1, 1894, and was crowned formally May 26, 1896. His father was Czar Alexander III, and his mother a daughter of the King of Denmark. He was president of the Committee of Succor during the Russian famine of 1891. He was married, Nov. 26, 1894, to Princess Alix of Hesse-Darmstadt. The coronation ceremonies were attended by representatives of almost every government on the globe. The young Czar immediately evidenced a tendency to deal liberally with all classes of his subjects. In September, 1896, the Czar and Czarina started upon a journey which included the principal courts and nations

of Europe. Everywhere they were greeted with enthusiastic cordiality, but especially in France.

NICHOLAS, NICOLAIEVITCH, Grand Duke of Russia, brother of Czar Alexander II, was born Aug. 8, 1831. He entered into active service at the age of 16. Nominated a general and inspector-general of engineers, he was commander-in-chief of the army, having General Todleben as his assistant. In the war against Turkey he received the chief command of the army of the Danube, which invaded Roumania, April 24, 1877. In April, 1878, he resigned the chief command of the Russian army before Constantinople, and was succeeded by General Todleben. He was afterward field-marshal and aide-de-camp to the Czar. He became insane in October, 1890, and remained in that condition until his death, in St. Petersburg, April 25, 1891.

NICHOLASVILLE, a town and the capital of Jessamine County, central northeastern Kentucky, 29 miles S.W. of Paris, and 14 S.W. of Lexington, on the Queen and Crescent Route and the Richmond, Nicholasville, Irvine and Beattyville railroad; is the trade center of a farming district; is known for its thoroughbred horses; has a hemp factory, and handles large quantities of tobacco annually. Population 1890, 2,157.

NICHOLS, EDWARD LEAMINGTON, an American physicist; born in Leamington, England, Sept. 14, 1854. He was graduated from Cornell University, New York, in 1875, and afterward spent four years in European study, receiving his doctor's degree from Göttingen University in 1879. From 1880 to 1887 he was successively fellow at Johns Hopkins University, assistant to Edison at Menlo Park, professor of physics in Central University, Kentucky, and professor of physics in the University of Kansas. He was appointed professor of physics in Cornell University in 1887. He was the author of a *Laboratory Manual of Physics and Applied Mechanics* (1894) and *The Galvanometer* (1894). He was also a constant contributor to scientific journals, and editor of *The Physical Review*.

NICHOLSON, MRS. ELIZA JANE, pseudonym "Pearl Rivers," an American journalist; born near Pearl River, Mississippi; the daughter of J. W. Poitevent. She contributed verses to *Lippincott's* and other periodicals under her pseudonym. A volume of her poems was published in 1873. She was given a position on the New Orleans *Picayune* by A. M. Holbrook, the proprietor of the paper, whom she afterward married. Upon his death she became sole owner of the *Picayune*, and afterward married George Nicholson, the business manager. She died in New Orleans, Feb. 15, 1896.

NICHOLSON, HENRY ALLEYNE, a British scientist; born in Penrith, Cumberland, Sept. 11, 1844, and educated at the Universities of Göttingen and Edinburgh. He was appointed professor of natural history and botany in the University of Toronto in 1871; professor of natural history in the University of St. Andrew's in 1875, and in 1882 regius professor of natural history in the

University of Aberdeen. He published original scientific works, principally geological and palæontological, among them *Geology of Cumberland and Westmoreland* (1866); *Palæontology of Ontario* (1875); and *Textbook of Zoölogy*.

NICHOLSON, JAMES WILLIAM AUGUSTUS, an American naval officer; born in Massachusetts, March 10, 1821. He entered the United States navy in 1838, and served in the Mexican War, and under Perry in the Japanese expedition. In the Civil War he engaged in the Port Royal expedition, was promoted commander, and had charge of the monitor *Manhattan* at Mobile Bay. In 1873 he was made commodore, and in October, 1881, was commissioned rear-admiral, and was assigned to duty in the Mediterranean and protected the United States consulate during the bombardment of Alexandria. He retired in March, 1883, and died in New York City, Oct. 28, 1887.

NICHOLSON, JOHN, a British soldier; born in Dublin, Dec. 11, 1822. In 1838 he joined the East Indian Company's service, and in 1840 was ordered to Ghazni, in Afghanistan. On the breaking-out of the Sikh war he served in the campaign on the Sutlej, and was present at the battle of Ferozeshah. During the Sikh rebellion he greatly distinguished himself by his daring and promptitude. The Punjab having finally become a British province, Captain Nicholson was appointed a deputy-commissioner under the Lahore board. In the mutiny in 1857 Nicholson did more than any other man to hold firm the British grasp of the Punjab. He suggested the formation of the famous "flying column," and supervised over its organization. As brigadier-general he led the first column of attack at the siege of Delhi, and after the troops had forced their way into the city he still exposed himself in the most fearless manner, and fell, shot through the body, Sept. 23, 1857.

NICKEL CARBONYL. See CHEMISTRY, in these Supplements.

NICKEL-STEEL. See IRON AND STEEL, in these Supplements.

NICKERSON, a city of Reno County, central Kansas, 10 miles N.W. of Hutchinson, on the Atchison, Topeka and Santa Fé railroad; is in a grain and stock-raising district, and has the railroad round-house and repair-shops. Population 1890, 1,662; 1895, 1,560.

NICOL, ERSKINE, a British painter; born in Leith, Scotland, in July, 1825. He studied at the Trustees' Academy, and became a teacher of drawing. In 1862 he removed his studio to London, and was made an associate of the Royal Academy in 1866. Among his paintings are *Toothache* (1862); *Among the Old Masters* (1865); *The Almshouse Nurse* (1869); *Paying the Rent* (1876); and *Unwillingly to School* (1877).

NICOLAY, JOHN GEORGE, an American historical writer; born in Essingen, Bavaria, Feb. 26, 1832; removed to the United States when a boy, and edited a paper in Pittsfield, Illinois. In 1857 he became assistant to the secretary of

state at Springfield, and in 1860 secretary to Abraham Lincoln. He went with President Lincoln to Washington, and served as his secretary until his death. From 1865 until 1869 he was United States consul in Paris, and from 1872 to 1887 was marshal of the United States supreme court. He wrote *The Life of Abraham Lincoln* (1888), published in the *Century Magazine* in serial form, in connection with John Hay, and also published *The Outbreak of Rebellion in Campaigns of the Civil War* (1881).

NICOLINI, SIGNORA. See PATTI, ADELINA M. C., in these Supplements.

NICOLLET, JEAN NICOLAS, a French-American explorer; born in Cluses, Savoy, July 24, 1786. He studied astronomy under Laplace, and became secretary and librarian of the observatory at Paris in 1817. In 1832 he came to the United States. Here he explored the Southern states and the Mississippi River and its western affluents. He collected at the same time many specimens of natural history. After this the United States War Department sent him on an exploring tour to the far West, with Lieutenant John C. Frémont as his assistant. He published an *Explanation of a Map of the Hydrographical Basin of the Upper Mississippi River* (1843). He died in Washington, District of Columbia, Sept. 11, 1843.

NICOLLS, SIR RICHARD, a British colonial governor of New York; born in 1624, in Ampt-hill, England. He served in the British army until 1664, attaining the rank of captain. He was sent to America in 1664 as the representative of Charles II, to take possession of the New Netherlands and to act as arbitrator between the other colonies. He landed on Long Island, Aug. 25, 1664, and immediately took formal possession, compelling the Dutch under Stuyvesant to take the English oath of allegiance. He governed the colony until Aug. 25, 1668, when he engaged in the naval war with Holland and was killed in battle with Admiral De Ruyter, May 28, 1672. While governor of New York he changed the name of the colony from New Netherlands to New York, and gave the names to the lower counties and Hudson River cities. He was popular both among the English and Dutch settlers.

NICOSIA or LEFKOSIA, the capital city of Cyprus, and situated in the north central part of the island, on the right bank of the river Pedias, 23 miles N.W. of the port of Larnaka. It has manufactures of carpets and leather goods, and a trade in cottons and wines. Population 1891, 12,500. For extended article, see NICOSIA, Vol. XVII, p. 491.

NICOTIANA. See TOBACCO, Vol. XXIII, pp. 423-427.

NICTHEROY, a town and the capital of the state of Rio de Janeiro, Brazil, at the mouth of the harbor of Rio de Janeiro. It is a residence suburb. The town sustained heavy bombardment during the naval rebellion of 1893-94. Population, about thirty-five thousand.

NIEL, ADOLPHE, a French marshal; born in

Muret, Oct. 4, 1802. He entered the army as an engineer officer; took part in the storming of Constantine in Algeria, the siege of Rome, the bombardment of Bomarsund in Finland, the fall of Sebastopol, and in the battles of Magenta and Solferino. His share in these battles won him the marshal's baton. He was made Minister of War in 1867, and was employed in reorganizing the French army when he died, Aug. 14, 1869. It was in honor of him that the Marechal Niel rose received its name.

NIEMEN OR MEMEL RIVER. See RUSSIA, Vol. XXI, p. 73.

NIEMEYER, JOHN HENRY, an American artist; born in Bremen, Germany, 1839. He was taken when a child by his parents to the United States. He studied in Paris, and in 1871 became professor of drawing in the Yale School of Fine Arts. He exhibited portraits and genre pictures in New York. Perhaps his best-known work is *Guttenberg Inventing Movable Type* (1869).

NIERSTEIN, a village of the Grand Duchy of Hesse, in Germany, on the Rhine, 10 miles S.E. of Mainz; famous for its wines. Population, 4,000.

NIETZSCHE, FRIEDRICH, a German author; born in 1844, in the village of Röcken, on the historic battle-field of Lützen. His ancestry, probably of Slavonic origin, a proud, pretentious race, settled in Saxony during the eighteenth century. Friedrich, being left an orphan at an early age, was fortunate in receiving a superior education, concluding his studies at Bonn and Leipsic. Although intended for the ministry, Nietzsche's rebellious spirit soon led him to renounce all faith in Christianity, on the ground that it impeded the free expansion of life. Turning his attention to Oriental studies, he became noted as an acute and comprehensive philologist, receiving the offer of a professorship in the University of Basel, Switzerland, a position he filled with great credit, although his heterodox, not to say revolutionary, opinions occasioned no little dismay among his staid and pedantic colleagues. He was at this period of his career strongly influenced by Schopenhauer and Richard Wagner, the latter being for a while his intimate personal friend. His radical doctrines found early expression in *The Old Faith and the New* and *The Value of History for Life*, written at this time. In 1876 incessant labor, together with extreme nervousness engendered by an uncongenial environment, induced brain and eye affections, compelling Nietzsche to relinquish his duties as instructor. Being retired on a pension, he was reduced to the condition of an invalid, spending his summers in Switzerland and in winter visiting the shores of the Mediterranean. His physical sufferings may be inferred from his own confession that the year contained for him two hundred days of pure and unadulterated pain. Yet it was during this interval of excruciating headaches, when the shadow of final eclipse was creeping upon his intellectual faculties, that he produced the works destined to rivet the attention of philosophical minds, recall-

ing the perfectionist theories of all ages, mingled with the pessimism of Schopenhauer, and fired with an iconoclastic ardor surpassing the wildest dreams of contemporary free thought. His doctrines, however, as embodied in the *über-mensch* ("the over-man"), are inspired with human interest and lofty aspirations, while in brilliancy of thought and diction and in epigrammatic force the writings of Nietzsche command admiration. In rapid succession he poured forth his works, amid the most distressed circumstances. *Human, all too Human*, appeared in 1879, quickly followed by *Dawn of Day*; *The Joyous Science* (1882); *So Spake Zarathustra* (1883-85), perhaps the most remarkable of his works; *Beyond Good and Evil* (1886); *The Genealogy of Morality* (1887); *The Case of Wagner* (1888), from whom he had unaccountably become estranged; *Twilight of the Idols* (1888); etc. But the tension induced by this surprising fertility of brain had been too great; the cord snapped suddenly, and Nietzsche became hopelessly insane. Yet, notwithstanding the pathetic close of his literary life and the evident traces in his works of an intellect already clouded by approaching doom, the germs of Nietzsche's philosophy have awakened in Germany a profound interest, even among his most pronounced antagonists, the constructive element in his writings, as well as their fearless iconoclasm, marking the author as the chief apostle of modern rationalism in its extreme, possibly aberrant, phase.

NIGER DISTRICT PROTECTORATE. See AFRICA, in these Supplements.

NIGHT-HAWK, a popular name for North American birds of the genus *Chordeiles*, belonging to the family of goatsuckers. They are often seen during twilight flying to a great height and then making a sudden downward rush, at the same time giving a sharp, rasping cry. They are valuable insectivorous birds.

NIGHTINGALE, FLORENCE, a British army nurse, the daughter of William Edward Nightingale, of Embley Park, England; born in Florence, in May, 1829. She early exhibited an intense devotion to the alleviation of suffering, which, in 1844, led her to give attention to the condition of hospitals. She visited and inspected civil and military hospitals all over Europe; and in 1851 went into training as a nurse. In 1854 war was declared with Russia, and the hospitals on the Bosphorus soon were crowded with sick and wounded. In this crisis Miss Nightingale offered to go out and organize a nursing-department at Scutari. Lord Herbert accepted her services, and she departed with thirty-four nurses.



FLORENCE NIGHTINGALE.

She arrived at Constantinople November 4th, on the eve of Inkermann, in time to receive the wounded into wards already filled with 2,300 patients, and a few months after her arrival she had 10,000 sick men under her care. In 1855, while in the Crimea, she was prostrated with fever, but refused to leave her post, and on her recovery remained at Scutari till Turkey was evacuated by the British, July 28, 1856. At the close of the Crimean War a fund of \$250,000 was subscribed for the purpose of enabling her to form an institution for the training of nurses; this is spent in connection with St. Thomas's (the Nightingale Home) and at King's College Hospital. In 1858 she published valuable *Notes on Nursing*. The *Notes on Hospitals* (1859), from the clearness of arrangement and minuteness of detail, are valuable to the architect, the engineer and the medical officer. In 1873 she published *Life or Death in India* and *A Note of Interrogation*, which attracted attention on account of the way she handled religious beliefs and life. Longfellow's *Santa Filomena* was written in her praise and honor.

NIHILISTS, NIHILISM. See SOCIALISM, Vol. XXII, pp. 217, 218.

NIKON, a Russian patriarch and primate; born in 1605 and died in 1681. He became patriarch of Moscow in 1652, and so changed the church services as to cause a secession of part of the members. See RUSSIA, Vol. XX, pp. 82, 105.

NILES, a city of Berrien County, southwestern Michigan, 21 miles S.S.E. of St. Joseph and 90 miles E. of Chicago, on the Cleveland, Cincinnati, Chicago and St. Louis and the Michigan Central railroads; has excellent water-power and important manufactures; flour and feed, straw paper, wood-pulp and furniture are extensively produced. It is in an agricultural district, and ships fruit and live-stock. Population 1890, 4,197; 1895, 4,508.

NILES, a city of Trumbull County, northeastern Ohio, on the Mahoning River, and on the Youngstown and Pittsburg and the Lake Erie railroads; one of the largest iron-manufacturing towns in the state, having blast-furnaces, nail-works, machine and boiler shops and rolling-mills. The vicinity abounds in coal, and the city is situated in the center of a rich dairying country. Population 1890, 4,289.

NILES, HEZEKIAH, an American journalist; born in Chester County, Pennsylvania, Oct. 10, 1777. He was a printer, and from 1800 to 1805 was in the publishing business in Wilmington. He went to Baltimore in 1805, and there edited a daily paper for six years. In 1811 he founded the weekly journal, *Niles' Register*, which he edited and printed till 1836. As a historical repository it was of such value that the editions from 1812 to 1827 were reprinted. His son, William Ogden Niles, maintained the paper until 1849, completing the seventy-sixth volume. He also published *Principles and Acts of the Revolution* (1822), and a series of humorous essays, entitled *Quill-Driving*. He died in Wilmington, Delaware, April 2, 1839.

NILOMETER, an arrangement for measuring the height of the Nile in Egypt. On the Island of Rhoda, opposite Cairo, is a square well, connected with the river by a canal and containing a graduated marble pillar, divided into 24 cubits, each measuring 21.386 inches. See EGYPT, Vol. VII, p. 706.

NILSSON, CHRISTINE. See MIRANDA, COUNTESS OF, in these Supplements.

NILSSON, SVEN, a Swedish naturalist and archæologist; born near Landsrona, Sweden, March 8, 1787. In 1812 he became instructor in natural history, and afterward overseer of the Zoölogical Museum. From 1831 to 1856 he was professor of zoölogy at Lund. His chief scientific publications are *Ornithologia Suecica* (2 vols.), and *Skandinavisk Faunä* (4 vols.). His most important archæological work is *Skandinaviska Nordens Urinnevanare* (4 vols., 1838-43). He died in Lund, Nov. 30, 1883.

NIMRUD, an ancient city. See NINEVEH, Vol. XVII, pp. 511, 512.

NIOBRARA FORT, a United States military post (Department of the Platte) in Cherry County, northern Nebraska, on the Niobrara River; post-office and telegraph station at the post; railroad station at Valentine, $4\frac{1}{2}$ miles W. on the Fremont, Elkhorn and Missouri Valley railroad. The post is situated in a reservation covering 540 square miles; has accommodations for 25 officers, six troops of cavalry and three companies of infantry, and in 1895 was garrisoned by seven companies of infantry. Fort Niobrara has played an important part in several Indian outbreaks, owing to its nearness to the reservations in South Dakota.

NIOBRARA RIVER. See NEBRASKA, Vol. XVII, pp. 307, 308.

NIPIGON OR NEPIGON. See ST. LAWRENCE, Vol. XXI, p. 178; and NEPIGON, in these Supplements.

NIPISSING, a lake in the province of Ontario, Canada, near the northeast side of Lake Huron, nearly midway between it and the Ottawa River. It contains many islands, upon one of which a summer hotel has been constructed. It discharges its waters into Georgian Bay by French River. Length, 50 miles; breadth, 14 miles; altitude, 599 feet.

NIPPON OR DAI-NIPPON, the Japanese name for JAPAN. See JAPAN, Vol. XIII, p. 569.

NIPPUR, an ancient Babylonian city discovered by the expedition sent out by the University of Pennsylvania, which began excavations in the old mound of Nippur (located by Sir Austen Layard about 1850) in February, 1889. The work was begun under the direction of Dr. John P. Peters, and from 1894 to 1896 under himself, Mr. J. H. Haynes and Professor Hilprecht. In 1895-96 the work had resulted in discoveries which, it has been alleged, supply the world with history antedating any ever before received. Prior to this, the earliest Babylonian kings of whom we have possessed accounts were Sargon I and his son, Naram-Sin, 3800-3570 B.C. Beneath the walls and pavements constructed by

these monarchs, excavations have revealed the walls and foundations of an older city. Pottery and inscribed tablets have been found, upon which the cuneiform inscriptions indicate, according to Professors Peters and Hilprecht, that the world, at 7000 B.C., had a civilization; that Babylonia was old and wise when the shepherd kings or pyramids of Egypt were young and new. Their computation rests upon the time taken in the accumulation of strata and in developing a system of cuneiform writing. A large collection of relics was brought to the University of Pennsylvania.

NIRVANA, THE BUDDHIST DOCTRINE OF. See **BUDDHISM**, Vol. IV, p. 433.

NITOCRIS, a queen of ancient Egypt. See **EGYPT**, Vol. VII, p. 734.

NITRATE COMPOUNDS. See **GUN-POWDERS**, in these Supplements.

NITRATE OF AMYL, a powerful drug used as an anti-spasmodic in affections of the chest. It is formed by the action of nitric acid or fusel oil, and its chemical representation is $C^5A^{11}NO^2$. In 1865 Sir Benjamin W. Richardson discovered its control over tetanus and other spasmodic affections. It is a volatile, yellowish liquid, having a fragrance like bananas, and on inhalation it produces violent arterial action in the head and neck, which quickly passes away. It is useful in some forms of asthma, in *agina pectoris* and other spasmodic symptoms arising in the vaso-motor system.

NITRIC ACID. See **CHEMISTRY**, Vol. V, pp. 511-513.

NITRIFICATION, a process carried on by certain peculiar bacteria of the soil, known as nitrobacteria, by which they oxidize ammonia compounds to nitrites and these to nitrates, the form in which nitrogen material is usually absorbed by plants. The nitrobacteria are peculiar among plants, in that they have the power of producing organic substance without the aid of chlorophyll and light. It is by the oxidative process known as nitrification that they obtain the necessary supply of kinetic energy.

NITRIFICATION, the changing of nitrogenous organic matter or ammonia compounds into nitrates. Under certain conditions, nitrification goes on in every fertile soil, the atmospheric nitrogen, nitrogenous organic matter, or ammonia compounds being converted, in the presence of lime or potash, into the corresponding *nitrates* of lime or potash; and from these compounds plants derive the most or all of their nitrogen, although some observers maintain that many plants obtain part at least of their nitrogen from ammonia. The oxidation of the nitrogen takes place through the agency of certain organisms called "nitrifying ferments."

NITROBENZOL, a chemical compound. See **ANILINE**, Vol. II, p. 48.

NITRO-HYDROCHLORIC ACID. Same as **AQUA REGIA**, q.v., in these Supplements.

NITROMETER. A chemical apparatus for determining the quantity of niter, nitric acid or some other combination of nitrogen in a mixture.

The preferred form is a tube bearing two bulbs; one is placed immediately below a filtering-funnel and is connected with an absorption-tube. The other bulb is connected and surmounted by a graduated absorption-tube. C. H. COCHRANE.

NITROUS ANHYDRIDE. See **CHEMISTRY**, in these Supplements.

NITROUS ETHER OR NITRITE OF ETHYL, a very volatile ether, with an agreeable apple odor and highly inflammable. In itself it is of little importance, but on account of its relation to the *sweet spirits of niter* or *spirit of nitrous ether*, is one of the most important drugs. The sweet spirits of niter contains in addition aldehyde and paraldehyde, and it is believed that to these we must ascribe much of its virtue. It is used, in conjunction with other medicines, as a diuretic, especially in the dropsy which follows scarlatina; and it is employed, in combination with acetate of ammonia and tartarized antimony, in febrile affections.

NITROUS OXIDE OR LAUGHING-GAS. See **CHEMISTRY**, Vol. V, pp. 512, 514.

NIZA OR NIZZA, MARCOS DE, an Italian-American explorer and missionary; born in the fifteenth century, probably in the last quarter. He became a Franciscan monk, went to the West Indies in 1531, and took part in the conquest of Peru. He afterward, with two companions, explored the Northwest into New Mexico, and went with Coronado on his famous expedition. His account of the discoveries of his first trip were so far from true that when Coronado's men learned the truth, and that the country was not rich in gold, it was with difficulty that Coronado protected Niza. Niza went back to Mexico alone, and died there in 1542.

NO OR NO-AMON, a city of ancient EGYPT. See Vol. VII, p. 776.

NOBLESVILLE, a city and the capital of Hamilton County, central Indiana, 20 miles N. N. E. of Indianapolis, on the White River, and on the Chicago and Southeastern and the Lake Erie and Western railroads; the trade-center of a farming region; has iron-works, lumber-mills, strawboard, novelty and carbon works. Population 1890, 3,054.

NOCTILIONES, a family of bats. See **MAMMALIA**, Vol. XV, p. 413.

NODES, LINE OF. See **ASTRONOMY**, Vol. II, p. 771.

NOGENT-LE-ROTHOU, a town in the department of Eure-et-Loir, France, prettily situated on the Huisne, 32 miles W. by S. of Chartres and 93 miles S.W. of Paris. It is a well-built place, with the ruined chateau of the great Sully, his violated sepulcher, and a statue of General Saint-Pol, who fell before Sebastopol. The Germans here won two fights, in 1870 and 1871. Population, 7,346.

NOISSEVILLE, a village of France, in the department of Meurthe-et-Moselle, about five miles from Metz; an important place during the Franco-Prussian War, several large battles having taken place here, principal among them the engage-

ment in which Manteuffel defeated the army of General Bazaine, Sept. 1, 1870.

NÖLDEKE, THEODORE, a German Orientalist; born in Harburg, March 2, 1836. He studied at Vienna, Leyden, Berlin and Göttingen, where he graduated in 1861. In 1864 he was made professor extraordinary at Kiel, and in 1868 professor ordinary. In 1872 he accepted the professorship of Semitic languages at the newly established University of Strasburg. He published *Geschichte des Korans* (1860); *Grammatik der Neusyrischen Sprache* (1868); *Untersuchungen zur Kritik des Alten Testaments* (1869); *Mandäische Grammatik* (1875); *Geschichte des Perserreiches zur Zeit der Sassaniden* (1879); *Syrische Grammatik* (1880); *Aufsätze zur Persischen Geschichte* (1887); *Beiträge zur Geschichte des Alexandersromans* (1890); *Orientalische Skizzen* (1892). He also wrote numerous articles for this *ENCYCLOPÆDIA*, including those on MOHAMMEDANISM (see Vol. XVI, pp. 545-597); KORAN (Vol. XVI, pp. 597-606); PAHLAVI (Vol. XVIII, pp. 134-136); PERSIA (*Anc. History*, Vol. XVIII, pp. 561-616); and SEMITIC LANGUAGES (Vol. XXI, pp. 641-656).

NOLHAC, PIERRE DE, a French writer; born in Ambert, Puy-de-Dôme, Dec. 12, 1859; in 1882 was admitted to the French school at Rome, where he remained three years. Upon his return to France he took the degree of doctor of letters, and was attached to the Bibliothèque Nationale at Paris, and was appointed in 1886 a professor at the École des Hautes-Études. After occupying the position of assistant curator of the Versailles Museum, he succeeded to the curatorship in 1892. He devoted his studies chiefly to the history of Italian and French renaissance, a list of his works including *Lettres de Joachim du Bellay* (1883); *La Bibliothèque d'un Humaniste* (1883); *Les Collections d'Antiquités de Fulvio Orsini* (1884); *Le Canzoniere Autographe de Pétrarque* (1886); *Petites Notes sur l'Art Italien* (1887); *La Bibliothèque de Fulvio Orsini* (1887); *Érasme en Italie* (1888); *Les Correspondants d'Alde Manuce, Matériaux Nouveaux d'Histoire Littéraire, 1483-1514* (1889); *Pétrarque et l'Humanisme* (1892); *Études sur la Cour de France: La Reine Marie-Antoinette* (1892).

NOMEIDÆ, family of shore-fishes found in tropical seas. See *ICHTHYOLOGY*, Vol. XII, p. 690.

NOMENCLATURE, GEOGRAPHICAL. See *GEOGRAPHIC NAMES, BUREAU OF*, in these Supplements.

NOMINALISM. See *SCHOLASTICISM*, Vol. XXI, pp. 418, 419, 430, 431.

NONIUS, MARCELLUS, a Latin grammarian, the dates of whose birth and death are unknown, the nearest that can be said being that he must have lived some time during the period from the second to the sixth centuries. He was the author of an important treatise entitled, *De Compensiosa Doctrina per Litteras ad Filium*. This work is divided into eighteen chapters, the first twelve being in reality separate treatises on different grammatical subjects, while each of the last six contains a list of technical terms referring to some one department. One feature of the work,

and one which makes it valuable, consists of the numerous quotations from Latin writers of an earlier date. Three editions have been published by Gerlach and Roth, Basil (1842); L. Quicher, at Paris (1871); and L. Müller, Leipsic (1888).

NORDAU, MAX SIMON, a Hungarian physician and author; born in Budapest, July 29, 1849, of Jewish parentage. He studied medicine in his native town and received his doctorate in 1873, and engaged himself in writing for the *Pester Lloyd*, the *Frankfurter Zeitung* and the *Vossische Zeitung*. After traveling in Europe he visited Paris in 1878, and settled there, resuming his medical studies and obtaining a doctor's degree in 1882. He con-



MAX NORDAU.

tinued his journalistic and literary labors, publishing political and social criticism. He then wrote some works which received wide attention and were translated into the English language. These appeared in 1885, and are known by their English titles as *Paris Pictures*; *Paradoxes*, a philosophical study; and *Conventional Lies*, dealing with religion, politics, economics, matrimony, etc., which was suppressed in Austria. Then appeared his work which brought him into greater prominence, translated and known to English readers as *Degeneration*, in which he endeavors to prove that the intellectual activity and excitement of the last half-century have resulted in the degeneration of a once healthy mental condition into maudlin and emotional sentimentality and salacious impurity. But there are those who see in the author himself a good example of the "degenerate," the depiction of which became with him a mania, all mania being symptomatic of degeneracy, according to his own definition.

NORDENSKJÖLD, BARON ADOLF ERIK, a Swedish, naturalist and explorer; born in Helsingfors, Finland, Nov. 18, 1832. He first went to the gymnasium at Borgo, and on entering the University of Helsingfors in 1849 devoted himself almost entirely to scientific studies, spending his vacations in excursions to the rich mineral localities of Finland. He soon became eminent in this particular branch of science. He settled in Sweden, and in 1851 first entered on his Arctic travels by accompanying Torell to Spitzbergen. (For descriptions of three subsequent expeditions, see *POLAR REGIONS*, Vol. XIX, pp. 323-326.) In recognition of his services he was created a baron in April, 1880, and named a commander of the Legion of Honor and a foreign knight of the Prussian Ordre pour le Mérite for Arts and Sciences.

NORDHAUSEN, a town of Prussia. Population 1890, 26,847. See *NORDHAUSEN*, Vol. XVII, p. 535.

NORDHOFF, CHARLES, an American journalist; born in Erwith, Westphalia, Prussia, Aug. 31,

1830. When five years old he accompanied his parents to the United States, and was educated at Cincinnati. In 1844 Nordhoff entered the United States' navy. He served three years, making a voyage around the world, remained at sea in the merchant, whaling and mackerel-fishery service until 1853, when he became employed in newspaper offices, first at Philadelphia, and afterward in Indianapolis, Indiana. From 1861 to 1871 he was on the editorial staff of the New York *Evening Post*. Then he traveled in California and the Hawaiian Islands from 1871 to 1873. After that he removed to Washington, District of Columbia, where he became special correspondent for the New York *Herald*. He published *Man-of-War Life* (1855); *The Merchant Vessel* (1855); *Whaling and Fishing* (1856); *Stories of the Island World* (1857); *Nine Years a Sailor* (1857); *Secession is Rebellion* (1860); *The Freedom of South Carolina* (1863); *America for Free Working Man* (1865); *Cape Cod and all Along the Shore* (1868); *California: A Book for Travelers* (1872); *Northern California, Oregon and the Sandwich Islands* (1874); *Politics for Young Americans* (1875); *The Cotton States in 1875* (1876); *God and the Future Life* (1881).

NORDICA, MADAME LILLIAN. See DOME, MRS. Z. F., in these Supplements.

NORFOLK, a city of Madison County, northeastern Nebraska, 17 miles N. of Madison, on the Chicago, St. Paul, Minneapolis and Omaha and the Fremont, Elkhorn and Missouri Valley railroads; has a foundry and machine-shop, cannery, creamery and beet-sugar factory, and is an important shipping-point. The surrounding country is devoted to grain and stock raising. The North Nebraska Insane Asylum is here. Population 1890, 3,038.

NORFOLK, a city and port of entry of Virginia, on the right bank of the Elizabeth River, 8 miles from Hampton Roads. Its large harbor is defended by two forts. Norfolk ships considerable quantities of cotton, oysters, and early fruits and vegetables; lines of steamers connect it with New York and other cities. The population in 1890 was 34,871. See NORFOLK, Vol. XVII, p. 537.

NORFOLK, HENRY FITZALAN HOWARD, DUKE OF, premier Duke and Earl of England, and holds besides these titles those of Earl of Arundel, Surrey and Norfolk; and Baron Fitzalan, Clun, Oswaldestre and Maltravers; and is hereditary Earl Marshal and Chief Butler of England. He was born in London, Dec. 27, 1847; and succeeded to the peerage on the death of his father, the fourteenth duke, Nov. 26, 1860. The Duke is a Roman Catholic, and in 1887 was charged with a special mission from Queen Victoria to the Pope on his jubilee. He was elected mayor of Sheffield, and in 1895 was appointed Postmaster-General in Salisbury's cabinet.

NORMAL, a city of McLean County, central Illinois, three miles N. of Bloomington, on the Chicago and Alton and the Illinois Central railroads. It is noted as the seat of the Illinois State Normal School, organized in 1857, which in 1891

had 19 instructors, 682 professional and graduated and 145 non-professional students. The school has a library of over seven thousand volumes. Normal is also the seat of the Illinois Soldiers' Orphans' Home. Population, 3,459.

NORMAL SCHOOLS, institutions in which the students are trained to become teachers. The students are young men or women, generally between 17 and 20 years of age, who have passed through a grammar-school, or even a superior school, and who have passed an examination in reading, writing, grammar, arithmetic, and in the geography of their own country. Most normal schools in the United States were modeled after those of the state of Massachusetts, and most of the European normal schools took those of the kingdom of Prussia as their patterns. According to the returns made to the Bureau of Education in 1893, more than half of the students pursuing teachers' training were in normal schools, the number being 27,926. There were 121 public schools, 1,301 instructors, 8,633 male students, 19,293 female students, and 4,491 graduates. Among the total number of normal students were 2,935 negro students, in normal schools of that race. Sixty-one per cent of the students in the public normal schools were in the teachers' training-courses. Beside these public schools, there were 39 private schools.

In the American normal schools the studies first attended to are those which the law of the respective state requires to be taught in the district schools, namely: orthography, reading, writing, English grammar, United States geography, and arithmetic. When these are mastered, studies of a higher order are progressively taken up. Those pupils who take the full course of three years are in addition instructed in composition, rhetoric, logic, penmanship and drawing, higher arithmetic, algebra, geometry, book-keeping, surveying, ancient and modern geography, chronology, general history, human physiology and hygiene, mental and natural philosophy, history of the United States, natural history, astronomy, music—and, above all, the science and art of teaching with reference to all the above-named studies.

NORMAN, a village and the capital of Cleveland County, central Oklahoma, 45 miles S. of Guthrie, on the Choctaw, Oklahoma and Gulf and the Atchison, Topeka and Santa Fé railroads; in a corn, grain and cotton region, and contains the University of Oklahoma (q.v., in these Supplements); has also flour and cotton-seed mills. Population 1890, 787.

NORMAN, HENRY, an English journalist and author; born in Leicester, in 1857; educated in Paris and at Harvard University, where he graduated in 1881, and took a two-years' post-graduate course at Leipsic. He then was engaged on the *Pall Mall Gazette*, London, for four years, and, on account of his proficiency in languages, was sent on several important missions abroad. Having inherited a small fortune, in 1888 he began to travel in the far East, visiting China, Siberia, Korea, Japan, Tonquin and Malaya; he visited the Franco-Chi-

nese frontier, crossed Korea on horseback, exploring a hitherto unknown portion of the Malay peninsula, being the first European to pass through the upper part of the closed native state of Kelantan. He became in 1892 a member of the editorial staff of the *Daily Chronicle* of London; was put in charge of the literary page, and in 1895 became assistant to the editor-in-chief, H. W. Massingham. He was sent to Constantinople to report on the Armenian atrocities; and from there, in 1895, he proceeded to Washington, District of Columbia, to ascertain the facts as to the Monroe doctrine. He made an exhaustive investigation of the matter, and was able to throw much light upon the subject. On his return to London from his Eastern travels he married Menie Muriel Dowie, who had traveled alone in masculine attire through the wildest parts of Europe, and who published an account of her experiences in a work entitled *A Girl in the Carpathian Mountains*. Mr. Norman published several works, his first appearing the year of his graduation at Harvard. Its title was *The Performance of Oedipus Tyrannus at Harvard*, which was followed later, as the result of his traveling, with *The Real Japan* (1891); *The Peoples and Politics of the Far East* (1894); and *Round the Near East* (1895).

NORMAN, SIR HENRY WYLIE, a British general; born in London, in 1826; achieved distinction as a soldier in India and afterward in the British civil service. He entered the Bengal army as an ensign in 1844, and served through the Punjab campaign in 1848. He was at the battles of Chillianwallah and Goojerat, and commanded a detachment in the Sonthal campaign. Throughout the Indian Mutiny he was a conspicuous figure. He was appointed assistant military secretary at the Horse Guards in 1860, and from 1862 to 1870 he was military secretary to the government of India, and afterward for seven years military member of the Viceroy's council. From 1878 to 1883 he was at the India office as military member in the council of the Secretary of State, and then he began his later civil career as governor of Jamaica. In 1889 he assumed the governorship of Queensland, and in 1893 he was appointed, as the successor of Lord Lansdowne, Viceroy of India, whose term of office expired in December. This post he at first accepted, but afterward declined.

NORMAN-NERUDA, MADAME. See HALLÉ, LADY, in these Supplements.

NORNS, a Scandinavian myth. See AESIR, Vol. I, p. 211.

NORONHA, FERNANDO DE, a group of small islands belonging to Brazil. See FERNANDO DE NORONHA, Vol. IX, pp. 99, 100.

NORRIS, WILLIAM EDWARD, an English novelist; born Nov. 18, 1847, the son of Sir W. Norris, formerly chief Justice of Ceylon. He was educated at Eton, and called to the bar at the Inner Temple in 1874, but did not practice, preferring the profession of literature, and contributing his first serials to *Cornhill*, *Temple Bar* and other magazines. His first novel, *Heaps of Money*, was

published in 1877, and there followed *Mademoiselle de Mersac* (1880); *Matrimony* (1881); *No New Thing* (1883); *His Grace*; *A Deplorable Affair*; *The Countess Radna* (1893); and several other books and serials. His novels are noticeable for their excellence of dialogue, and are generally descriptive of aristocratic society. His series of novels include *Thirlby Hall* (1884); *A Man of His Word* (1885); *My Friend Jim* (1886); *A Bachelor's Blunder* (1886); *Major and Minor* (1887); *The Rogue* (1888); *Miss Shafto*; *Mrs. Fenton* (1889); *The Baffled Conspirators*; *Marcia*; *Mrs. Wentworth's Idea* (1891); *Mysterious Mrs. Wilkinson* (1892); *A Deplorable Affair* (1894); *The Countess Radna*; *Mathew Austin*; *A Victim of Good Luck* (1894); *St. Ann's*; *A Despot's Lady* (1895).

NORRISTOWN, a borough and the capital of Montgomery County, Pennsylvania. See NORRISTOWN, Vol. XVII, p. 553. Population 1890, 19,791.

NORTH, JOHN THOMAS, a British millionaire, familiarly known as "the Nitrate King"; was born in Leeds, England, Jan. 30, 1842, his father being a coal-merchant. From his fifteenth to his twenty-third year he was an apprentice millwright, after which he was a foreman in the Fowler Locomotive Works, Leeds. Upon the death of his father he and his wife emigrated to Chile, where he obtained an appointment as an engineer on a railway at Carrizal. At that time speculation in nitrate was rife in Peru, and he proceeded thither, where he secured certain privileges for supplying the place with drinkable water. These privileges laid the foundation of his vast fortune. He acquired rich deposits of guano and nitrate of soda in the province of Tarapaca, built railroads and ships to transport these products to the Peruvian coast and British ports. He took an active financial part in connection with public works in South America, and after an absence of twenty years returned to England with a fortune estimated at \$100,000,000. In January, 1889, he presented Kirkstall Abbey and grounds to his native city, Leeds, and received the freedom of that place January 25th of the same year. He purchased a fine old estate at Eltham, near London, where he entertained lavishly; made handsome gifts to the Leeds Infirmary and to the Yorkshire College of Science. In 1889 he registered his racing-colors, his most fortunate horse being *Nunthorpe*, which in 1891 won the City and Suburban stakes, and followed this up by winning the Jubilee stakes. He was perhaps even better known in the coursing world as the owner of the famous *Fullerton*, winner of the Waterloo cup four times in succession. In 1895 he contested West Leeds as a Conservative against Herbert Gladstone, his canvass being such a farce that the Conservative journals, after his defeat, congratulated the party thereon. He was colonel of the Tower Hamlets Engineer Volunteers. His last speculation was the creating of a vast pleasure-resort at Ostend. He was popular with the Prince of Wales and in society, notwithstanding his many native eccentricities. He died suddenly while presiding over

a meeting of one of his companies in London, May 5, 1896.

NORTH ADAMS, a village of Massachusetts. It has a library, founded in 1884, which has over 15,000 volumes. In 1896 a building valued at \$125,000 was presented to the town by A. C. Houghton as a memorial to A. J. Houghton of Boston. Population 1890, 16,074; 1895, 19,135. See **NORTH ADAMS**, Vol. XVII, p. 555.

NORTHAMPTON, a city and the capital of Hampshire County, Massachusetts, on the Boston and Maine and the New York, New Haven and Hartford railroads. Population 1890, 14,990. See **NORTHAMPTON**, Vol. XVII, p. 558.

NORTH ATTLEBORO, a town of Bristol County, central southeastern Massachusetts, 14 miles N. by E. of Providence and 30 miles S.S.W. of Boston; known for its manufactures of jewelry, and contains a public library. Population 1890, 6,727; 1895, 6,576.

NORTH BALTIMORE, a village of Wood County, northern Ohio, 13 miles south of Bowling Green, on the Baltimore and Ohio railroad. It has natural gas, and glass and brick works. Population 1890, 2,857.

NORTH BAY, a town of Nipissing District, northern Ontario, on the Canadian Pacific railroad, 364 miles W. of Montreal. Population 1890, 1,400.

NORTH BROOKFIELD, a town of Worcester County, central Massachusetts, 15 miles W. of Worcester, on the Boston and Albany railroad; has boot and shoe industries; is in a farming and dairy district, and has a library which in 1896 contained 5,128 volumes. Population 1890, 3,871; 1895, 4,635.

NORTH CAPE, a promontory in the Arctic Ocean, at the north extremity of the island of Magerö, in lat. $71^{\circ} 10' 12''$ N., long. $25^{\circ} 46' 12''$ E.; separated from Norway by a narrow channel.

NORTH CAROLINA has, according to the latest corrected surveys, a gross area of 52,250 square miles, of which 3,670 square miles are water surface and 48,580 square miles, or 31,091,200 acres, are land surface.

The comparisons given below are taken from the eleventh decennial census:

	1880.	1890.
Population	1,399,750	1,617,947
Percentage of increase over preceding census	30.65	15.59
Relative rank in population	15	16
Density of population to the square mile	28.81	33.30
Urban population (cities of 8,000 or over)	26,615	62,544
Percentage of urban population of the whole	1.90	3.87
Number of cities of 8,000 or over	2	5
Number of male inhabitants	687,908	799,149
Number of female inhabitants	711,842	818,798
Percentage of native-born population	99.73	99.77
Number of negroes	531,277	561,018
Increase of negroes since the preceding census	139,627	29,741
Number of civilized Indians	1,230	1,514

In 1889 North Carolina had 3,627,585 acres devoted to the culture of the cereals, the total production being 34,880,901 bushels. Of the total area, 65.07 per cent was under corn; 18.37 per cent under wheat; 14.94 per cent under oats; 0.01 per cent under barley; 1.56 per cent under rye; and 0.05 per cent under buckwheat. The acreage and product of each of the cereals is given below:

PRODUCT.	ACREAGE.	BUSHEL.
Corn	2,360,627	25,783,623
Wheat	666,509	4,292,035
Oats	541,851	4,512,762
Barley	302	3,521
Rye	55,496	276,339
Buckwheat	1,800	12,621

The census reports show that in 1889 North Carolina had in cotton 1,147,136 acres, which produced 160,396,497 pounds, or 336,261 bales of 477 pounds each. The area devoted to cotton was greater than that of 1879 by 253,983 acres, an increase of 28.44 per cent; but while this gain in acreage was made, the production was decreased by 16,091,397 pounds, equal to 9.12 per cent. Of the 96 counties of the state, 80 produced more or less cotton, three having over 50,000 acres, 15 less than 1,000 acres; 49 ranged from 1,000 to 25,000 acres, and 13 from 25,000 to 50,000 acres. In the raising of flax the state stood 21 in acreage, 23 in production of seed, 13 in production of fiber, 23 in total value of product, 28 in the average yield of seed per acre, and 24 in the average value of products per acre. In tobacco, North Carolina stood 3 in the area devoted and 4 in production, the acreage having been 97,077 and the yield 36,375,258 pounds, an increase of 9,389,045 pounds over the crop of 1879. In the area devoted to rice the position was 4, the acreage 12,241, an increase over 1879 of 1,395 acres. The total production was 5,846,404 pounds, an average of 478 pounds to the acre. The following comparative farm statistics are taken from the reports of the eleventh decennial census:

	1880.	1890.
Total number of farms	157,609	178,359
Average size of farms, acres	142	127
Total area of farms, acres	22,363,558	22,651,896
Total area of farms, improved	6,481,191	7,828,569
Total area of farms, unimprov'd	15,882,367	14,823,327
Value of lands, fences and buildings	\$135,793,602	\$183,977,010
Value of implements and machinery	\$6,078,476	\$7,183,210
Value of live-stock, June 1	\$22,414,059	\$25,547,280
Value of three items above, total	\$164,286,737	\$216,707,500
Number of horses	133,686	131,451
Number of mules and asses	81,871	100,011
Number of neat cattle	657,426	630,993
Number of swine	1,453,541	1,251,006
Number of sheep, not including lambs	461,638	402,247
Pounds of wool shorn	917,756	733,765
Pounds of butter	7,212,507	13,129,374
Acres of meadow-land mown	101,758	190,754
Tons of hay harvested	89,528	191,262
Bushels of Irish potatoes	722,773	1,199,416
Bushels of sweet potatoes	4,576,148	5,665,391

All agricultural interests were rapidly advanced from 1890. The corn crop of 1893 approximated 30,000,000 bushels, and that of 1894 33,000,000 bushels. The report of the labor commissioner for 1895 gives the number of cotton-mills in the state at 156, which had been increased at the opening of 1896 to 167. The number of looms was near 25,000, the number of spindles approximately 1,000,000. In the mills 4,900 men, 6,150 women and 4,700



STATE SEAL OF NORTH CAROLINA.

children were employed, making a total of 15,750 employees. The capital invested was fully \$15,500,000 at the beginning of 1896, and during the preceding year near 125,000,000 pounds of cotton was used.

Much attention has been given since 1890 to truck-farming, and as much as \$750,000 worth of produce has been shipped from a single town in one season. Peanuts are extensively grown, North Carolina having been at one time almost the only source of supply of the article in the United States. The culture of the silk-worm has gained a firm hold among the industries of the state, one mill turning out about eighteen thousand pounds of finished product annually. Since 1870 much attention has been given to grape-culture, both for the manufacture of wine and the supply of Northern markets with grapes. The climate is specially adapted to grapes, as is the soil, and vineyards are found in almost all sections. No state in the union has within its boundaries so large a number of the plants used in *materia medica*, the Atlantic slope of the Blue Ridge furnishing near two thousand five hundred varieties. One firm annually ships over two million pounds, the dried herbs, roots and barks going to all parts of the world. In 1890 North Carolina had 3,367 specified manufacturing industries, in which \$32,745,995 were invested as capital, 36,214 persons were engaged whose wages annually reached the sum of \$7,830,536 and finished products of the value of \$40,375,450 were turned out. Prominent among the various industries were cotton goods, yielding \$9,563,443; flouring and grist-mill products, \$5,279,068; lumber in different forms, almost \$7,000,000; tar and turpentine, \$1,705,833; and tobacco in all forms almost \$8,000,000. Other industries of importance were oil, cotton-seed and cake, carriages and wagons, fertilizers, and foundry and machine-shop products.

The fisheries of North Carolina yielded a return in 1889 of \$1,351,944. In 1895 the number of men employed approximated 6,000, the boats and vessels about 2,500. The value of the products is nearly equally divided between sea and river products. The shad and herring fisheries are the most important of any state, and the greater portion of the catch is made in and about the Albemarle Sound. Oysters are abundant, the area of the public grounds exceeding 20,000 acres and the natural beds nearly

5,000 acres. Legislative protection has been thrown around the oyster and fishery interests, and the laws are rigidly enforced.

Reports made in 1895 regarding the public schools of the state give the school population of the preceding year at 601,900 whites and 359,385 colored, the former having 4,603 schools and the latter 2,376. The expenditures for school purposes for the year amounted to \$775,449. The average monthly salary of white male teachers was \$26.33, for colored male teachers, \$24.69; for white female teachers, \$22.72, and for colored female teachers, \$20.14. In 1895 was celebrated the centennial commencement of the State University (q.v., in these Supplements). Normal schools are maintained at several points in the state, that at Greensboro, for girls, having at the commencement of 1895 about 400 students in attendance. At the same time the State College of Agriculture and Mechanic Arts, established in 1889, had about 230 students. At Cullowhee is a normal school under state control, and colored institutions of the same class are in operation at Fayetteville, Salisbury, Goldsboro, Franklinton, Plymouth and Elizabeth City. A summer school for teachers and those preparing to teach is held annually at the University of Chapel Hill.

Of the denominational educational institutions in North Carolina, the Methodist Episcopal Church



CAPITOL BUILDING, RALEIGH, NORTH CAROLINA.

has Trinity College, at Durham, and Livingston College, at Salisbury; the Presbyterian Church, Biddle University, and Charlotte and Davidson Colleges, at Davidson; the Lutheran Church, Lenoir College, at Hickory, and North Carolina College, at Mount Pleasant; the Baptist Church, Wake Forest College, at Wake Forest, and Shaw University, at Raleigh; the Methodist Episcopal South Church, Weaver College, at Weaverville; the Reformed Church, Catawba College, at Newton; and the Friends Church, Guilford College, at Guilford College.

In 1890 there were in North Carolina 6,824

church organizations, 6,512 edifices and a membership of 685,194, which constituted 42.35 per cent of the population. The value of all church property within the state was \$7,077,440. Thirty different denominations were represented, the principal ones being the Baptists, all bodies, with 3,144 organizations; Christians, 158; Disciples of Christ, 186; all Lutheran bodies, 131; all Methodist bodies, 2,413; all Presbyterians, 411; Protestant Episcopal, 178.

The legislature appropriated in 1895 for state institutions, for the two years following, the amounts herewith given: Raleigh Asylum, \$141,880, of which \$11,390 was a special appropriation; Morgantown Asylum, \$200,000, of which \$20,000 was special; Eastern Hospital (colored) \$95,000, of which \$20,000 was special; Deaf and Dumb Institute, at Morgantown, \$91,500, of which \$21,500 was special; Blind Institute, \$80,000; Soldiers' Home, \$17,000; Penitentiary, \$49,000; State University, \$20,000; Normal and Industrial School, \$37,500, of which \$10,000 was special; Agricultural and Mechanical College, \$50,000, of which \$30,000 was special; Agricultural and Mechanical College (colored), \$10,000; Colored Normal Schools, \$13,250; Orphan Asylum, \$20,000, and Colored Orphan Asylum, \$6,000. In July, 1895, the orphan asylum located at Oxford had 104 inmates, almost evenly divided between boys and girls. The institution is under the control of the Masonic order, and about one half of the expenditures, which average about \$10,000 annually, come from the different lodges of the state, from churches and earnings of the asylum. The Raleigh Asylum for the Insane has an average of about 300 inmates, the one at Morgantown about 550, and the Eastern Hospital about the same as the one at Raleigh. The Colored Orphans' Asylum, at Oxford, has about 75 inmates, the state contributing \$1,500 annually, which is about one half the expenditures, the remainder coming from churches and charitable institutions.

The receipts from all sources, according to the report of the state treasurer in 1894, were \$2,008,810; the disbursements for the same period, \$1,197,483. The taxable property of the state was valued at \$262,927,119. The per capita, state and county taxes amounted to \$1.44. Estimates of the total public indebtedness, state and county, place the aggregate at about one twenty-fifth part of the taxable valuation of the property of the state.

In 1895 the total railroad mileage was reported at 3,616, with a valuation of \$24,501,899. The number of persons employed on the different lines aggregated 9,439. The gross earnings amounted to \$9,008,054, and the net income to \$2,974,475.

North Carolina had in 1895 a National Guard consisting of 32 commissioned officers, 1,462 infantry, 45 cavalry and 175 naval artillery. The entire force formed a brigade, consisting of 28 infantry companies equally divided among four regiments, one troop of mounted riflemen and a battalion of naval artillery. There was also one company of infantry (colored) unattached. The appropriation for the maintenance of the Guard for the year mentioned was \$16,000 from the state and \$9,500 from the Federal government.

Jan. 1, 1896, there were 209 newspapers published in North Carolina, of which 22 were daily, 2 semi-weekly, 172 weekly, 4 semimonthly and 9 monthly. Papers were published in 78 of the 96 counties of the state, in 111 of the cities, towns and villages, and in 71 county seats.

The following is a list of the principal cities and towns of North Carolina, with their populations as given in the census of 1890: Wilmington, 20,056; Raleigh, 12,678; Charlotte, 11,557; Asheville, 10,235; Winston, 8,018; Newbern, 7,843; Durham, 5,485; Salisbury, 4,418; Concord, 4,339; Fayetteville, 4,222; Henderson, 4,191; Goldsboro, 4,017.

The following is a list of the governors of North Carolina from 1776, together with their respective terms of office: Richard Saswell, 1776-79; Abner Nash, 1779-81; Thomas Burke, 1781-82; Alexander Martin, 1782-84; Richard Caswell, 1784-87; Samuel Johnston, 1787-89; Alexander Martin, 1789-92; Richard Dobbs Spaight, 1792-95; Samuel Ashe, 1795-98; William R. Davie, 1798-99; Benjamin Williams, 1799-1802; James Turner, 1802-05; Nathaniel Alexander, 1805-07; Benjamin Williams, 1807-08; David Stone, 1808-10; Benjamin Smith, 1810-11; William Hawkins, 1811-14; William Miller, 1814-17; John Branch, 1817-20; Jesse Franklin, 1820-21; Gabriel Holmes, 1821-24; Hutchings G. Burton, 1824-27; James Iredell, 1827-28; John Owen, 1828-30; Montford Stokes, 1830-32; David L. Swain, 1832-35; Richard D. Spaight, 1835-37; Edward B. Dudley, 1837-41; John M. Morehead, 1841-45; William A. Graham, 1845-49; Charles Manley, 1849-51; David S. Reid, 1851-55; Thomas Bragg, 1855-59; John W. Ellis, 1859-61; Henry T. Clarke, 1861-62; Zebulon B. Vance, 1862-65; William W. Holden, 1865; Jonathan Worth, 1865-68; William W. Holden, 1868-72; Tod R. Caldwell, 1872-74; Curtis H. Brogden, 1874-77; Zebulon B. Vance, 1877-81; Thomas J. Jarvis, 1881-85; Alfred M. Scales, 1885-89; Daniel G. Fowle, 1889-91; Thomas M. Holt, 1891-93; Elias Carr, 1893-96; and D. L. Russell, 1897. See NORTH CAROLINA, Vol. XVII, pp. 558-562.

NORTH CAROLINA, UNIVERSITY OF, located at Chapel Hill, in Orange County. The university was



"THE OLD WEST" UNIVERSITY OF NORTH CAROLINA. founded in 1793, under a charter secured in 1789, its first endowment being Governor Benjamin Smith's gift of 20,000 acres of land in Tennessee.

The campus consists of 50 acres; the buildings are nine in number. A fine tract of 500 acres of woodland adjoins the campus. The university has departments of arts, literature, philosophy and law, and courses in agriculture, arts, etc. There is also a post-graduate course. In 1895 it had 35 professors and instructors and over 500 students. It is non-sectarian, and provides special facilities for poor but deserving students; has a library of about 36,000 volumes; the value of the grounds and buildings is about \$250,000, and its productive funds amount to \$130,000. Its total income averages \$45,000, \$20,000 from the state.

NORTHCOTE, SIR STAFFORD. See **IDDESLEIGH, LORD**, in these Supplements.

NORTH DAKOTA, one of the north central group of states, and the thirty-ninth to be admitted



STATE SEAL OF NORTH DAKOTA.

to the Union. The first settlement made within the territory of Dakota, which now constitutes the states of North and South Dakota, was in 1780, by a French trader, who located at Pembina. The United States government expedition under Lewis and Clarke passed through the country, in 1804 going to and in 1806 returning from the Columbia River. A Scottish colony under a grant from the Hudson Bay Company settled at Pembina in 1812, remaining in possession until Aug. 8, 1823, when Maj. S. H. Long, in charge of a United States expedition, reached that point and raised the flag over the settlement. The first attempt at navigation of the waters of Dakota was in 1832, when the *Yellowstone*, a side-wheel steamboat, ascended the Missouri River to Fort Union, near the mouth of the Yellowstone River, in the interests of the American Fur Company of Pittsburgh, which also sent the *Assiniboine* up the same river, but it was burned on its return trip with a cargo of furs, near the mouth of Heart River. Nebraska territory was organized May 30, 1854, and May 11, 1858, Minnesota became a state, leaving the country which now comprises North and South Dakota and Wyoming without legal organization. On March 2, 1861, the territory of Dakota was organized, and the year following its capital was located at Yankton. At this time Indian troubles were frequent, the Sioux being almost constant aggressors. In September, 1862, they made two unsuccessful assaults on Fort Abercrombie. In 1868 almost 90,000 square miles was taken from the territory of Dakota to form Wyoming territory. The Northern Pacific railroad broke ground for its line at Grand Forks, Jan. 2, 1872, which event began an era of rapid development, the settlement at Bismarck, the present capital of North Dakota, having

been made in that year. A detachment of government troops under General Custer headed a scientific expedition to the Black Hills in 1874, from which the first authentic reports of that part of the country were obtained. In 1883 the seat of government was removed to Bismarck, and September 4th of the same year a convention met at Sioux Falls and framed a state constitution for Dakota, with the 46th parallel (the present southern boundary of North Dakota) as the northern boundary of the proposed new state. Eight days later a convention of citizens of the northern part of the territory assembled at Fargo to protest against this constitution. In 1884 and 1885 many new territorial institutions were opened, among the number being the North Dakota University, at Grand Forks, in the former year, and the Jamestown Insane Hospital, April 30th, in the latter year. On a vote as to the separation of South Dakota, in November, 1887, a majority was recorded in favor of the measure, North Dakota voting against it and South Dakota favoring it. The opposing factions gradually came together, and a convention held at Watertown, Dec. 5, 1888, reported in favor of the division of the territory, the northern portion to form the state of North Dakota and the southern portion the state of South Dakota. Having passed both houses of the Congress, the bill providing for the admission of the two new states was signed by President Cleveland, Feb. 22, 1889. The act relating to North Dakota provided for the assembling of a convention at Bismarck, July 4th, to prepare a constitution for submission to the people at an election to be held on the first Tuesday of the following October; and also for a division of the institutions, debts, records, etc., of the territory between the two proposed states. Upon receiving notice of the adoption of the constitution, the President was to issue his proclamation, admitting the state to the Union. The bill provided for the following grants of public domain:

	ACRES.
For university purposes.....	46,080
For public buildings at the capital.....	32,000
For public buildings at the capital (additional).....	50,000
For agricultural colleges.....	130,000
For a school of mines.....	40,000
For a reform school.....	40,000
For a deaf and dumb asylum.....	40,000
For the university.....	40,000
For normal schools.....	80,000
For general educational and charitable purposes.....	170,000

The state also became entitled to the customary land grant for public schools. Thirty thousand dollars was granted to erect a state penitentiary, the territorial prison having been set off to South Dakota. The state was to form one United States judicial district and be entitled to one representative in Congress, until otherwise provided.

The constitution framed at the Bismarck convention of 1889 provided for a senate and house of representatives, the former to consist of not less than 30 nor more than 50 members, to hold office for the term of four years; and the latter to consist of not less than 60 nor more than 140 members, their term of service to be two years. The sessions of the legislature are biennial, and after the first must not exceed 60 days; the passage of local and special

laws was forbidden, and all acts, except in the event of an emergency, were to take effect on July 1st, next after the close of the session at which passed.

The governor holds office for two years, or until his successor becomes duly qualified. He has the power to veto any separate item of an appropriation bill. The lieutenant-governor presides over the senate, not voting except in a case of equal division of the senators. In the event of the disability of the governor, he acts as such, the next in line of succession being the secretary of state.

The government also comprises a secretary of state, auditor, treasurer, superintendent of public instruction, commissioner of insurance, three commissioners of railroads, an attorney-general, and a commissioner of agriculture and labor—each to hold office for two years. The treasurer is not to hold office for more than two consecutive terms.

The supreme court has appellate jurisdiction only; consists of three judges elected by the people at large, to hold office for six years. When the population of the state exceeds 600,000, the number of judges may be increased to five. The people also elect district and county judges and justices of the peace.

All elections are conducted with secret ballots. Women are declared eligible to any school office, and are given the right to vote for school officers.

Other provisions are as follows:

The public schools are open to all children of the state, and free from sectarian control; the funds arising from the sale or lease of lands granted for educational or charitable purposes by the United States must never be diminished; the total annual tax for state purposes is limited to four mills on the dollar; railroads are taxed on their gross earnings; no state debt can be incurred in excess of \$200,000 over and above the amount of indebtedness at the time of the adoption of the constitution; county and municipal indebtedness is also limited; the labor of children under 12 years of age is prohibited in mines, factories and workshops; the "black-listing" of employees is a misdemeanor; flowing streams and natural water-courses are to remain forever the property of the state for mining, irrigating and manufacturing purposes. Amendments to the constitution must be passed by a majority vote in two succeeding legislatures and be approved by a majority of the electors at a general election.

At the election, October 1st, the constitution was ratified by a heavy vote; the proposed article prohibiting the manufacture and sale of intoxicating liquors received a majority of 1,159 votes. On November 3d the proclamation admitting North Dakota to the Union was promulgated.

Up to 1895 North Dakota had many severe financial situations to battle with. The collection of taxes levied was difficult on account of the monetary depression, felt most severely among the farmers, the largest class of tax-payers. The unpaid taxes up to 1895 were as follows:

1889 and prior years -----	\$117,893.93	1892 -----	\$ 25,816.86
1890 -----	26,053.69	1893 -----	52,090.61
1891 -----	22,570.36	1894 -----	320,353.85
Making a total of \$564,779.30.			

North Dakota lies between lat. 46° and 49° N. and long. 96° 25' and 104° 5' W. of Greenwich. It is bounded on the north by the Canadian provinces of Assiniboia and Manitoba; on the east by Minnesota; on the south by South Dakota, and on the west by Montana. The winters are cold, but the dryness of the atmosphere renders the low temperature endurable. At Bismarck the mean annual temperature is 39.4; at Fargo, 37; at Pembina, 34. The mean annual rainfall varies in different localities, that of Bismarck being 20.10 inches; Fargo, 27.17; Pembina, 21.91; and Fort Buford, 13.91.

The population of North Dakota in 1890 was 182,719. In 1880 the population of that part of Dakota territory which now constitutes North Dakota was 36,909, the gain during the decade constituting an increase of 395.05 per cent. The gross area of North Dakota is 70,795 square miles, of which 600 square miles is water surface. The density of population in 1890 was 2.60 to the square mile. The percentage of native-born population was 55.42, that of the foreign-born was 44.58. The relative proportion of females to males is 79,859 to each 100,000. The number of negroes in North Dakota in 1890 was 373, the number in South Dakota being 541; a total in the two states of 914. The number of Chinese was given at 28, the number of Japanese at 1 and the number of civilized Indians at 194.

Essentially an agricultural region, North Dakota early came into prominence as a highly productive portion of the United States. The following facts are taken from the census reports of 1890:

Total acreage devoted to the cereals-----	2,235,345
Production of the cereals in bushels-----	33,939,074
Percentage of the whole area under corn-----	0.37
Percentage of the whole area under wheat----	83.74
Percentage of the whole area under oats-----	12.45
Percentage of the whole area under barley----	3.38
Percentage of the whole area under rye-----	0.05
Percentage of the whole area under buckwheat--	0.01
Total number of acres under corn-----	11,954
Total number of bushels of corn produced----	178,129
Total number of acres under wheat-----	2,709,421
Total number of bushels of wheat produced----	26,403,305
Total number of acres under oats-----	402,855
Total number of bushels of oats produced----	5,773,129
Total number of acres under barley-----	109,400
Total number of bushels of barley produced----	1,570,717
Total number of acres under rye-----	1,568
Total number of bushels of rye produced----	12,195

Considering North and South Dakota together, the acreage of meadow-land to be mown for hay was increased from 1879 to 1889 more than tenfold, or 1,924,813 acres were added; the number of horses on farms was increased by 339,566, the per cent of increase being 814.89, the greatest in the country; the number of swine was increased from 63,394 in 1880 to 682,678 in 1890; the number of sheep was increased by 289,687, and the clip of wool 1,427,301 pounds; the number of working oxen was greater by 49,938; the number of milch cows was more than seven times greater in 1890 than in 1880, the increase being 257,957, and notwithstanding the total number of cattle of all kinds averaged less than ten to the square mile, the annual production of milk in both North and South Dakota amounted to more than 100 gallons per capita of

population. Both of the Dakotas were included in the states reporting an increase in the product of butter on farms, and were noted as being among the very few states not experiencing a large decrease in the amount of cheese made on farms. In the eleventh census the state of North Dakota stood



CAPITOL BUILDING, BISMARCK, NORTH DAKOTA.

seventh in area devoted to flax, seventh in the production of seed, and eighth in the total value of all flax products. The acreage was 43,724 and the amount produced 164,319 bushels. In 1880, 664,086 bushels of Irish potatoes were raised; in 1890 the yield was 3,163,742 bushels, an increase of 2,499,656 bushels.

In the census returns of 1890 the two states of North and South Dakota are compared with the territory of Dakota, in tables of agricultural statistics. It therefore becomes necessary to give the combined returns from both states, in order to make intelligent comparisons between 1880 and 1890:

Total number of farms in Dakota territory in 1880	17,435
Total number of farms in North Dakota in 1890	27,611
Total number of farms in South Dakota in 1890	50,158
Total number of farms in North and South Dakota in 1890	77,769
Increase in the number of farms, 1880 to 1890	60,334
Total acreage in farms in Dakota territory in 1880	3,800,656
Total acreage in farms in North Dakota in 1890	7,660,333
Total acreage in farms in South Dakota in 1890	11,396,460
Total acreage in farms in North and South Dakota in 1890	19,056,793
Increase in the acreage in farms, 1880 to 1890	15,256,137
Acres of improved land in farms in Dakota territory, 1880	1,150,413
Acres of improved land in farms in North Dakota in 1890	4,658,015
Acres of improved land in farms in South Dakota in 1890	6,959,293
Acres of improved land in farms in North and South Dakota in 1890	11,617,308
Increase in acres of improved land in farms, 1880 to 1890	10,466,895
Value of land, fences and buildings, Dakota territory, 1880	\$ 22,401,084

Value of land, fences and buildings, North Dakota, 1890	\$ 75,310,305
Value of land, fences and buildings, South Dakota, 1890	\$107,466,335
Value of land, fences and buildings in North and South Dakota, 1890	\$182,776,640
Increase in value of land, fences and buildings, 1880 to 1890	\$160,375,556
Value of farm-implements and machinery, Dakota territory, 1880	\$ 2,390,091
Value of farm-implements and machinery, North Dakota, 1890	\$ 6,648,180
Value of farm-implements and machinery, South Dakota, 1890	\$ 8,371,712
Value of farm-implements and machinery, North and South Dakota, 1890	\$15,019,892
Increase in value of farm-implements and machinery, 1880 to 1890	\$ 12,629,801
Value of live-stock, Dakota territory, June 1, 1880	\$ 6,463,274
Value of live-stock, North Dakota, June 1, 1890	\$18,787,294
Value of live-stock, South Dakota, June 1, 1890	\$29,231,509
Value of live-stock, North and South Dakota, June 1, 1890	\$48,018,803
Increase in value of live-stock, 1880 to 1890	\$41,555,529
Increase in value of three above items	\$214,560,886

The 27,611 farms of North Dakota were divided according to size as follows: Fourteen were under 10 acres; 11 were over 10 and under 20 acres; 117 were over 20 and under 50 acres; 508 were over 50 and under 100 acres; 25,192 were over 100 and under 500 acres; 1,380 were over 500 and under 1,000 acres, and 389 were over 1,000 acres, the average size being 277 acres. Of the whole number of farms, 25,698 were cultivated by the owners, 539 were rented for a fixed money value and 1,374 were rented for a share of the products.

In 1894 the state commissioner of agriculture reported as follows: The tendency of the farmers of the state is toward diversification of crops. The acreage of wheat, once considered the great staple of the two Dakotas, has increased since the census year but 16 per cent, while the acreage of oats, barley, flax, rye, corn and potatoes, considered as a whole, has increased about 47 per cent. During the four years oats increased about 24 per cent, barley 150 per cent, rye more than 500 per cent, potatoes about 23 per cent. Flax and corn have been less steady, increasing one year to decrease the next. In 1890 the greatest flax acreage in the history of the state was recorded, 114,000 acres. This dropped to about one fourth that acreage in 1892, but since has recovered, the crop of 1894 being about equal to that of 1890. The following report was gathered by the county assessors in 1894:

CROP.	1893.		1894.
	Acres Sown.	Amount Harvested (Bushels).	Acres Sown.
Wheat	3,019,253	31,732,169	3,037,643
Oats	502,447	10,498,451	548,369
Barley	227,250	3,993,236	258,252
Flax	57,467	330,214	110,365
Rye	40,959	367,976	52,099
Corn	15,582	242,734	38,696
Potatoes	15,783	1,299,090	19,627
Millet and Hungarian grass	65,111	80,378 (tons)	100,775

The number of sheep sheared in 1893 was 259,-599, the clip 1,549,540 pounds. In 1894 the number of farms in the state had increased to 30,023, the number of acres under cultivation was 4,520,246 and the total acreage of farms 7,448,-887. The total number of acres in crops, including tame grasses, amounted to 4,195,576, and in cultivated timber of more than one year's growth there were 36,792 acres.

In 1890 North Dakota had 382 specified manufacturing industries, in which the capital employed amounted to \$2,894,553; the number of persons engaged numbered 1,847, whose annual wages amounted to \$1,002,881, and the finished products aggregated \$5,028,107. Flouring and grist-mill products led in importance, the amount of the output being \$2,624,198. Other industries of importance were printing and publishing, saddlery and harness, foundry and machine-shop products, and tobacco and cigars.

For the fiscal year ending June 30, 1894, the superintendent of public instruction of North Dakota reported 1,199 organized districts of all kinds, 88 graded schools, 1,878 ungraded schools; total seating-capacity of all schoolhouses, 64,445; total value of school property, \$1,910,638; enumeration for apportionment in 1895 showed 63,567 pupils; average monthly wages of male teachers \$44.75, of female teachers \$39.03. At the time of this report there were 9,501 trees growing on school-grounds, mainly planted by the pupils on Arbor day. State normal schools are maintained at Mayville, on an appropriation in 1893, for the two years following, of \$30,000; and at Valley City, on an appropriation for the two years, 1893 and 1894, amounting to \$14,000. A normal department is maintained in the University of North Dakota. The North Dakota Agricultural College is also under state control, and receives aid both from the state and the Federal government.

North Dakota in 1890 had 868 church organizations, 335 edifices, a membership of 59,496, which was 32.56 per cent of the entire population, and church property of the value of \$780,775. The number of denominations was 22, the principal ones being the Baptists, with 54 organizations; the Roman Catholics, with 115; the Congregationalists, with 65; the Lutherans, with 298; the Methodists, with 140; the Presbyterians, with 100; and the Protestant Episcopal, 39.

For 1895 the state treasurer reported the receipts from county taxes, \$334,165; from railroads, \$97,-223; from insurance, \$18,760; from sale of warrants, \$210,000; receipts from all sources, including a balance of \$61,568 carried over from 1894, were \$1,160,225. The total amount of expenditures was \$1,103,676, leaving a balance of \$56,549 at the opening of 1896. The appraisalment for the purposes of assessing the taxes for 1895 resulted in values being equalized as follows: Real property \$69,006,738, personal property \$21,252,947, a total of \$90,633,966. The state indebtedness at the close of 1895 amounted to \$845,807, the maximum indebtedness allowed by the constitution.

The railway mileage in North Dakota at the close of 1895, according to the assessment made in each

county of the state, was 2,506.48. Three of the five lines of road operating partly within the state reported deficits after comparing the gross receipts with the operating expenses.

The state charitable, reformatory and penal institutions include the School for the Deaf at Devil's Lake, the State Hospital for the Insane at Jamestown, Soldiers' Home at Lisbon, and the State Penitentiary at Bismarck. An institution for the blind was in course of erection at Bathgate, in Pembina County, in 1896.

In 1894 an irrigation plant was established at Bottineau, and the results proved favorable. In addition to the numerous streams, many of them considerable rivers, North Dakota has admirable provisions for irrigation in artesian wells. In 1896 there were 672 flowing wells, besides hundreds from which water is obtained by pumping. Of the former, the most noted is the Minnehaha, at Turtle Mountains, which flows 283 gallons per minute.

Jan. 1, 1896, there were 139 newspapers published in North Dakota, of which 9 are daily, 124 weekly, 1 semimonthly and 5 monthly. Papers are published in 37 of the 55 counties and in 84 of the cities, towns and villages of the state, of which 34 were county seats.

The following is a list of the principal cities and towns of North Dakota, with their populations, as given in the census reports of 1890: Fargo, 5,664; Grand Forks, 4,979; Jamestown, 2,296; Bismarck, 2,186; Grafton, 1,594; Wahpeton, 1,510; Mandan, 1,328; and Valley City, 1,089.

Governors of North Dakota from the admission of the state into the Union in 1889, with their respective terms of office: John Muller, 1889-91; A. H. Burke, 1891-93; E. Shortridge, 1893-95; Roger Alin, 1895-97; F. E. Briggs, 1897-.

For map and account of the original territory, see DAKOTA, Vol. VI, pp. 773, 774.

NORTHFIELD, a town of Franklin County, central northwestern Massachusetts, on the east bank of the Connecticut River, just south of New Hampshire, on the Vermont Central railroad. It is the birthplace of Dwight L. Moody, the evangelist, and the headquarters of the Christian educational institution founded by him, including Northfield Seminary for Young Ladies, located at Northfield, and Mount Hermon School for Young Men, in the town of Gill, four miles distant. Population 1890, 1,869.

NORTHFIELD, a city of Rice County, southwestern Minnesota, 34 miles S. of St. Paul and 32 miles W.S.W. of Red Wing, on the Minneapolis and St. Louis and the Chicago, Milwaukee and St. Paul railroads; has a foundry and machine-shop, saw and planing mills; is surrounded by a farming country. It contains Carleton College (Congregational), a co-educational institution founded in 1870, having in 1896, 22 instructors, 277 students, and a library containing 12,000 volumes. Also St. Olaf College (Lutheran), a co-educational institution, organized in 1874 and having in 1896, 10 instructors, 122 pupils, and a library containing 1,600 volumes. Population 1890, 2,659; 1895, 3,456.

NORTHFIELD, a town of Washington Coun-

ty, central Vermont, 9 miles S.S.W. of Montpelier, on the Central Vermont railroad; noted for its slate quarries. It has flannel, excelsior and granite works and a corn cannery. Northfield is the seat of a military school, known as Norwich University, established in 1834. Population 1890, 1,222.

NORTH MAGNETIC POLE. See METEOROLOGY, Vol. XVI, p. 163; also MAGNETISM, Vol. XV, p. 221.

NORTH PLATTE, a city and the capital of Lincoln County, central southwestern Nebraska, 50 miles E. of Ogallala, on the Union Pacific railroad and at the north and south forks of the Platte River. It has extensive railroad repair-shops, employing a great number of men, and a large flour-mill, and is surrounded by an extensive cattle-raising and agricultural district. Population 1890, 3,055.

NORTHROP, CYRUS, an American educator; born in Ridgefield, Connecticut, Sept. 30, 1834; graduated at Yale in 1857, and at the law school of that college in 1859. After practicing law at Norwalk, Connecticut, he became clerk of the house of representatives of the state (1861); and of the senate (1862). The following year he was editor of the New Haven *Daily Palladium*; from 1863 to 1884 professor of rhetoric and English literature in Yale College; and from 1869 until 1881 collector of customs at the port of New Haven. In 1884 he was appointed president of the University of Minnesota.

NORTH SEA AND BALTIC CANAL. See CANALS, in these Supplements.

NORTHUMBERLAND, a borough of Northumberland County, central Pennsylvania, 2 miles N. of Sunbury and 60 miles N. of Harrisburg, on the Delaware, Lackawanna and Western, Northern Central, Pennsylvania and the Philadelphia and Reading railroads and at the junction of the two branches of the Susquehanna River; has rolling-mills, nail-works, saw-mills, agricultural-implement works and other manufactories. Population 1890, 2,744.

NORTHUMBERLAND, ALGERNON GEORGE PERCY, DUKE OF, an English nobleman; born in 1810, and educated at Eton and St. John's College, Cambridge, of which university he was made a doctor of laws in 1842. He first entered Parliament as member for the borough of Beeralston, and represented the northern division of Northumberland in the Conservative interest from 1852 down to 1865. He held office in 1858-59, first as a lord of the admiralty and afterward as vice-president of the Board of Trade. He succeeded to the dukedom in 1867, was appointed Lord Privy Seal in 1878, and in the latter year appointed chairman of the Royal Commission charged with conducting an inquiry into the parochial charities of the city of London. He was president of the Royal Institution, honorary colonel of the Northumberland militia, and lord-lieutenant of Northumberland.—His eldest son, **EARL PERCY** (born in 1846), was long Conservative member for North Northumberland, and was called to the House of Lords in his father's barony of Lovaine in 1887.

NORTHUMBRIA. See NORTHUMBERLAND, KINGDOM OF, Vol. XVII, p. 568.

NORTH VERNON, a village of Jennings County, southeastern Indiana, 2 miles N.W. of Vernon, on the Baltimore and Ohio, the Cincinnati, Columbus, Chicago and St. Louis and the Pittsburg, Cincinnati, Chicago and St. Louis railroads; has graded schools; several breweries are here, and it manufactures chairs, flour, furniture and woolen goods. Population 1890, 2,012.

NORTHWESTERN ALLIANCE. See FARMERS' ORGANIZATIONS, in these Supplements.

NORTHWESTERN UNIVERSITY, a co-educational institution, maintained at Evanston, a suburb of Chicago, by the Methodist Episcopal Church;



LIBRARY, NORTHWESTERN UNIVERSITY.

chartered in 1851 and organized and opened in 1855. It is provided in the charter that the institution "shall remain located in or near the city of Chicago." The location of the campus, comprising 45 acres of oak-grove, along the front of Lake Michigan, could scarcely have been better chosen. The schools are divided between Chicago and Evanston. Those at Evanston are the College of Liberal Arts, the Garrett Biblical Institute and the School of Music. The College of Liberal Arts has four courses: classics, philosophy, modern literature, and science. The Garrett Biblical Institute, comprehending Heck Hall and Memorial Hall, though under a separate corporation, serves as the theological department, and includes a Norwegian-Danish and a Swedish theological seminary. The schools of law, medicine, pharmacy and dentistry, as well as the woman's medical school, are located at Chicago. There are nearly a hundred professors and instructors; and the number of students in 1896 was 3,016. The university maintains high standards in all its departments. The medical school was the first medical school in the United States to insist on preliminary entrance examinations. It was one of the first to establish a four-years' course. Its law school has a three-years' course, and grants the degree of LL.B. The Dearborn Observatory belongs to the university, and its telescope, the largest when made, has an 18½-inch aperture. The library contains over twenty-six thousand volumes, and is particularly rich in the classics. The income of the university amounts to \$265,000, much of the property being in Chicago. Henry Wade Rogers, A.M., LL.D., formerly dean of the law school of the University of Michigan, was elected president of the institution in 1890, and was the first layman to hold the office.

NORTH-WEST TERRITORIES. The North-West Territories of Canada apply to the vast region, over 1,300,000 square miles in extent, lying west of Manitoba and the district of Keewatin, formerly owned by the Hudson Bay Company. Out of this

great tract a group of four districts was organized, in 1882, by the Dominion government, with a total area of 507,227 square miles, of which 8,946 square miles are water. The following are the districts, with their separate areas in square miles: Assiniboia (89,535); Saskatchewan (107,092); Alberta (106,100), and Athabasca (104,500). The Canadian Pacific railroad traverses both Assiniboia and Alberta, onward, across the Rocky Mountains to the Pacific Coast. Both districts are bounded on the south by the international boundary line. Assiniboia is flanked by Manitoba on the east and by Alberta, or long. 111° W., on the west. Its northern limit is the southern boundary of Saskatchewan (lat. 52° N.), which has the same western boundary as Assiniboia, and a northern boundary near lat. 55° N. The eastern limit of Saskatchewan is Manitoba and Lake Winnipeg. The western boundary of Alberta is the Rocky Mountains, and its northern is also the line, lat. 55° N. To the north of Alberta is the district of Athabasca, which is bounded on the south by lat. 55° N. and on the north by lat. 60° N.; its eastern boundary is long. $111^{\circ} 50'$ W. and its western long. 120° W. The population of the semi-organized territories is, approximately, 90,000, of which about 15,000 are Indians, or 20,000 including the nomadic tribes that people the northern water-courses flowing into the Arctic Ocean. The Indians of this region include the half-breeds, located along the two branches of the Saskatchewan River, who in 1885 took part in the Riel rebellion against the Dominion government. The capital of the North-West Territories is Regina, in the district of Assiniboia, 357 miles W. of Winnipeg. It is the seat of the local government and the headquarters of the North-West Mounted Police, a force 1,000 strong, maintained by the Dominion authorities for the preservation of law and order. Since 1888 the affairs of the North-West Territories have been administered by a lieutenant-governor, an advisory council or executive of three members, and a legislative assembly of 29 members. In 1894, by act of the Federal Parliament the local assembly, which represents the four organized districts, was given full control of the finances of the Territories, the number of its local representatives, the boundaries of the constituencies; it also increased the period of existence of the assembly to four years. Representation was also given the Territories, in the Dominion Parliament, by two members in the Senate and four in the House of Commons.

There is no public debt, the government of the Territories not having power to borrow money or pledge the public credit. The federal vote for 1895-96 amounted to \$242,879, \$115,000 of which was appropriated for the purposes of education and \$65,000 for roads, bridges and public works. The first school district in the Territories was organized in 1884. In 1896 there were 304 public schools, 2 Protestant separate schools, 44 Roman Catholic public schools and 11 Roman Catholic separate schools. The number of pupils averages 8,000. Denominationally, the population is roughly classified as one half Protestant, 15 per cent Roman Catholic and 35 per cent pagan (Indian). The

chief towns besides the capital are Edmonton, Prince Albert and Battleford, on the north branch of the Saskatchewan, and Moosomin, Moose Jaw, Medicine Hat and Calgary, on the line of the Canadian Pacific railroad, and Lethbridge, on the Belly River, near Fort McLeod. Lethbridge has of recent years become a center of the rich coal country in the southern portion of the district of Alberta. The coal is bituminous, and in the locality has been estimated to cover an area of 15,000 square miles. Though not of the best quality, for the farmer and colonizer it is an important "find" in a vast treeless region. Near Banff and close to the line of the Canadian Pacific railway a mine of anthracite coal is being developed. This deposit represents the only true anthracite coal which is being worked in America, outside of Pennsylvania. It is said to contain a larger amount of fixed carbon and give greater heat than the Pennsylvania coal, and also to burn more rapidly. Extensive coal-measures have also been tapped along the valleys of the Peace and Bow rivers and the North Saskatchewan. The output of the commodity in the Lethbridge region aggregated, in 1894, 250,000 tons.

It is, however, as a great grain-producing and cattle-ranching area that the North-West Territories are most noted. So rich and extraordinarily fertile is the soil that it needs no laborious tilling, and there are no tree-stumps or rocks to interfere with the operations of the sulky plow or detract from the joy of the harvesting. The one drawback is the distant market and the high freights which have to be disbursed to reach it. Against this chief drawback, the scarcity of labor and perhaps the lack of adequate machinery for farming operations on a large scale, and the taxes on it which a high tariff imposes, are wholly subordinate. The chief grazing-region lies in the district of Alberta, on the slopes of the Rocky Mountains, where cattle and horses range winter and summer without shelter. The census of 1891 gives the following as the live-stock of the Territories: Horses, 42,956; horned cattle, 233,721; sheep, 64,920; and swine, 16,293. To the north of the Territories stretch the vast solitudes utilized by the Hudson Bay Company as "the last great fur preserve of the world."

NORTH WILMINGTON, a borough of Lawrence County, central eastern Pennsylvania, near Volant, known as the site of Westminster College, a co-educational institution, organized in 1854, having, in 1896, 10 instructors, 250 pupils, and a library containing 4,000 volumes. Population 1890, 684.

NORTHWOOD, a village and the capital of Worth County, northern Iowa, 23 miles N.W. of Osage, on the Burlington, Cedar Rapids and Northern railroad; has a newspaper office, graded schools, and a flour-mill; is in a farming district. Population 1890, 859; 1895, 1,133.

NORTH YAKIMA, a city and the capital of Yakima County, central southern Washington, 30 miles S. of Ellensburg, on the Northern Pacific railroad, and at the confluence of the Yakima and Natchess rivers; is in a rich agricultural district, and has good water-power from the Yakima River, for its mills. Grain, fruit, tobacco, sorghum, hops and

alfalfa are grown; dairy products and live-stock are shipped. Population 1890, 1,750.

NORTON, ANDREWS, an American theologian; born in Hingham, Massachusetts, Dec. 31, 1786. He graduated at Harvard in 1804; was appointed mathematical tutor there in 1811; and in 1813 librarian of the university and lecturer on Biblical criticisms and interpretation. In 1819-30 he was Dexter professor of sacred literature. He was among the most distinguished exponents of Unitarianism, equally determined in his protest against Calvinism and in his opposition to the school of Theodore Parker and the naturalistic theology. His chief writings are *Reasons for Not Believing the Doctrines of Trinitarians* and two works on *The Genuineness of the Gospels*. He made also a translation of the Gospels. The latter, after his death (which occurred in Newport, Rhode Island, Sept. 18, 1853), was edited by his son and Dr. Ezra Abbot.

NORTON, CHARLES ELIOT; born in Cambridge, Massachusetts, Nov. 16, 1827; graduated at Harvard in 1846, and traveled in India and Europe in 1849-51, and again in Europe in 1855-57 and 1868-73; and in 1864-68 was joint editor with Lowell of the *North American Review*. He published *Recent Social Theories* (1853); *The "New Life" of Dante* (1858); *Notes of Travel and Study in Italy* (1859, 1888); *The Soldier of the Good Cause* (1861); *A Catalogue of the Plates of Turner's Studiorum* (1875); *William Blake's Illustrations of the Book of Job* (1875); *List of the Principal Books Relating to the Life and Works of Michael Angelo* (1879); *Historical Study of Church-Building in the Middle Ages* (1880); *A Translation of Dante's Divina Commedia* (1891); *The Heart of Oak Books* (1895); edited *Correspondence Between Carlyle and Emerson* (1883); *Correspondence Between Goethe and Carlyle* (1887); *Reminiscences and Letters of Carlyle* (1886); and *Letters of James Russell Lowell* (1894). In 1874 he was appointed professor of the history of art at Harvard; in 1879 became president of the Archæological Institute of America, holding that office for 11 years, and in 1884 received the honorary degree of Lit.D. from Cambridge, England, and in 1887 that of LL.D. from Harvard.

NORTON, LILLIAN, an American opera singer, better known as Madame Nordica. See DOME, MRS. Z. F., in these Supplements.

NORTON, WILLIAM EDWARD, an American marine-painter; born in Boston, in 1843. He was a house-painter in his youth, and, while his fellow-workmen were anxious for all the easy, indoor work he was ready to do graining and similar work outdoors in the roughest weather, for the sake of the study. He came of a ship-building family, and took two or three sea-voyages to get sea effects, having determined to become a marine-painter even in those early days. This discipline and conscientious study, added to his natural gifts, made him a decided success in the world of marine-painters. After painting in Boston for several years, he went abroad in 1877, and opened a studio in London, where he continued to reside. Among his early works, which made his name in Boston, are *Gathering Help*; *Whaleships Trying Out*; and *Early Morning*. At the Philadelphia Centennial Exhibition of

1876 he exhibited *Fog on the Grand Banks*; and in recent Royal Academy exhibitions he had *The Thames Near Blackwell*; *Twilight on the Banks of Newfoundland*; and *Becalmed on the Grand Banks*. At the World's Columbian Exposition in Chicago he was represented by *Moonlight on the River*; *Return of the Herring Fleet, Holland*; *A Moment's Rest*; *Off the Dutch Coast*; and *Mid-Channel*.

NORUMBEGA, a name, whether of Indian, Norse or Spanish origin is uncertain, by which the early French explorers of America designated a region or city on the northeastern shore of New England, or possibly within the limits of what are now known as the British Provinces. According to B. F. De Costa, in his work on *Norumbega and the English Explorers*, a very similar name occurs in the map of Verrazano (1529). With various spellings the name also appears in maps and records of other authors of the period, the site of the lost city being variously located, on the Penobscot in Nova Scotia, Newfoundland, the country of the lower Hudson, and, lastly, by the late Professor Eben N. Horsford, along the lower reaches of Charles River, Massachusetts. See also LEIF ERICSON, in these Supplements; and AMERICA, Vol. I, p. 706.

NORWALK, a township of Connecticut, for the geographical location of which see NORWALK, Vol. XVII, p. 574. It is on the New York, New Haven and Hartford R.R.; two weekly and one daily papers are published; has two savings and three national banks; two public libraries and sixteen churches. Population of township 1890, 17,747.

NORWALK, a city and the capital of Huron County, northern Ohio; 16 miles southeast of Sandusky and 56 miles southwest of Cleveland. It is in a farming region where considerable attention is given to dairying. It has manufactories of agricultural implements, pianos, organs, sewing-machines, lumber and flour. Population 1890, 7,195. See also NORWALK, Vol. XVII, p. 574.

NORWAY. (For general article on the kingdom of Norway see NORWAY, Vol. XVII, pp. 575-592.) Norway has an area of 124,445 square miles. The

COUNTIES.	AREA, ENGLISH SQ. MILES.	POPULATION, JAN. 1, 1891.
Kristiania (town) ----	6	150,239
Akershus ----	2,055	99,111
Smaalenene ----	1,600	120,360
Hedemarken ----	10,621	119,129
Kristians ----	9,793	108,076
Buskerud ----	5,790	104,769
Jarlsberg og Larvik --	896	100,957
Bratsberg ----	5,865	92,034
Nedenes ----	3,609	81,043
Lister og Mandal ----	2,805	78,738
Stavanger ----	3,532	117,008
Søndre Bergenhus ---	6,026	128,213
Bergen (town) ----	5	53,684
Nordre Bergenhus ---	7,132	87,552
Romsdal ----	5,788	127,806
Søndre Trondhjem ---	7,184	123,817
Nordre Trondhjem ---	8,791	81,236
Nordland ----	14,517	131,850
Tromsø ----	10,134	65,125
Finmarken ----	18,296	29,170
Totals -----	124,445	2,000,917

latest official census (1891) placed the population at 2,000,917. The preceding table gives the population by provinces:

The population of the principal towns was:

Kristiania	151,239	Fredrikstad	12,451
Bergen	53,684	Larvik	11,261
Trondhjem (and suburbs)	29,162	Fredrikshald	11,217
Stavanger	23,899	Kristiansund	10,381
Drammen	20,687	Skien	8,979
Kristiansand	12,813	Aalesund	8,406
		Moss	8,051

CENTRAL EXECUTIVE GOVERNMENT. The year following the coronation of Charles XIII, a charter (the riksakt) was promulgated, establishing new fundamental laws on terms of perpetual union with Sweden, declaring such union indissoluble and irrevocable, yet without prejudice to the separate local government of each country. The law of succession to the throne is the same in both countries. In case of absolute vacancy of the throne, the two diets are to assemble for the election of the future sovereign, and should they not be able to agree upon one person, an equal number of Swedish and Norwegian deputies will meet at the city of Karlstadt, in Sweden, for the appointment of the king, this nomination to be absolute. The common affairs are decided upon in a council of state, composed of Swedes and Norwegians. In case of the minority of the king, the council of state is to exercise the sovereign power until a regent or council of regency is appointed by the united action of the Diets of Sweden and Norway.

The latest revision of the constitution of Norway was made in 1889. The legislative power of the realm continues to be vested in the "storting," or Great Court, which is declared to be the "representative of the sovereign people." The king of Sweden and Norway, however, possesses the right to veto laws passed by the Storting, but only for a limited period. The royal veto may be exercised twice; but if the same bill pass three storthings formed by separate and subsequent elections, it becomes the law of the land without the assent of the sovereign. The king has the command of the land and sea forces, and makes all appointments, but, except in few cases, is not allowed to nominate any but Norwegians to public offices.

The Storting assembles every year. New elections take place every three years. The meetings take place *suo jure*, and not by any writ from the king or the executive. They begin in February each year, and must receive the sanction of the king to sit longer than two months. Every Norwegian citizen of twenty-five years of age can vote, who, in the year before election, has paid income tax on an annual income of at least five hundred kroner in the country districts, or eight hundred kroner in the towns (provided that he has resided one year in the electoral district at the time when the election takes place, and that he does not belong to the household of another as a servant), or who is or has been a public functionary, or possesses property in land, or has been tenant of such property for five years at least, or is a burgess of any town, or possesses real property in a town of the value of six hundred kroner.

Under the same conditions, citizens thirty years of

age, and settled in Norway for at least ten years, are entitled to be elected. The mode of election is indirect. Toward the end of every third year the people choose their deputies, at the rate of one to fifty voters in towns, where the election is administered by the magistrate, and one to a hundred in rural subdistricts, where they meet in the parish church under the presidency of the parish minister. The deputies afterward assemble and elect among themselves, or from among the other qualified voters of the district, the Storting representatives. No election takes place for vacancies, which are filled by the persons who receive the second largest number of votes. Of the total male population, 45 per cent are 25 years of age and above. The Storting has 114 members—38 from towns, 76 from rural districts.

The Storting, when assembled, divides itself into two houses, the "Lagthing" and the "Odelsting." The former is composed of one fourth of the members of the Storting, and the other of the remaining three fourths. Each house nominates its own presidents. If the Odelsting and Lagthing do not agree, the two houses assemble in common sitting, to deliberate, and the final decision is given by a majority of two thirds of the voters. The same majority is required for alterations of the constitution. The Storting can also form itself into a high court of justice for the impeachment and trial of ministers, members of the chief court of justice and members of the Storting. While in session, every member of the Storting has an allowance of 12 kroner a day, besides traveling expenses.

The executive is represented by the King, who exercises his authority through a Council of State, composed of two ministers of state and at least seven Councilors. Two of the councilors, who change every year, together with one of the ministers, form a delegation of the Council of State, residing at Stockholm, near the King. Ministers and Councilors of State are entitled to be present in the Storting and to take part in the discussions when public, but without a vote.

There are eight council ministers at Kristiania, Norway, and a delegation of three located near the King, at Stockholm, Sweden.

The reigning monarch is King Oscar II, the fourth sovereign of the house of Ponte Corvo, and grandson of Marshal Bernadotte, Prince de Ponte Corvo, who was elected heir apparent of the crown of Sweden by the Parliament of the kingdom, Aug. 21, 1810, and ascended the throne Feb. 5, 1818, under the name of Carl XIV Johan. He was succeeded at his death, March 8, 1844, by his only son, Oscar. The latter died July 8, 1859, and was succeeded by his eldest son, Carl XV, at whose premature death, without male children, the crown fell to his next surviving brother, the present king.

The royal family of Sweden and Norway has a civil list of \$331,665 from Sweden, and \$120,430 from Norway. The sovereign, besides, has an annuity of \$83,330, voted to King Carl XIV and his successors on the throne of Sweden.

FINANCE AND DEFENSE. The revenue and expenditure for the year 1894 were, respectively, \$16,-

£87,500 and \$16,483,500, which amounts vary but little each year.

The army, on Jan. 1, 1894, numbered 30,000 men, with 900 officers. The number of troops of the line actually under arms can never exceed 18,000 men, even in war, without permission of the Storting. The King has permission to transfer, annually, 3,000 men from Norway to Sweden, and *vice versa*, for "common military exercises" only.

The naval force of Norway consists of four iron-clad monitors, an armored gunboat, two wooden corvettes, 33 gunboats, beside a small torpedo flotilla. Excluding the smaller class of gunboats, which have little value, Norway's effective fleet is about 31 in all. All the seafaring men in the seaports between the ages of 21 and 35 are enrolled in either the active fleet or naval militia. They numbered, in 1894, nearly 25,000 men.

NORWEGIAN LANGUAGE. See **SCANDINAVIAN LANGUAGES.** Vol. XXI, p. 373.

NORWICH, a city of New London County, southeastern Connecticut, on the Central Vermont and the New York and New England railroads. It has two public libraries, a hospital and art museum. The population of the town was, in 1890, 21,143; of the city, 16,156. See also **NORWICH**, Vol. XVII, p. 596.

NORWICH, a village and the capital of Chenango County, central New York, 52 miles S.S.W. of Utica, on the New York, Ontario and Western and the Delaware, Lackawanna and Western railroad, in an agricultural, dairying, and hop-growing country; has several creameries, a blast-furnace, a foundry, the repair-shops of the New York, Ontario and Western railroad, a brewery, and manufactories of sashes, doors, blinds, silk goods, hammers and chairs. Population 1890, 5,212.

NOSE, DEVELOPMENT OF. See **SENSE-ORGANS**, in these Supplements.

NOSOLOGY. See **CULLEN, WILLIAM**, Vol. VI, p. 695.

NOSTOC, a genus of the *Schizophytes*, or fission-alge, found in water and damp places, and often occurring in cavities of higher plants. The plant body is a chain-like filament of cells, in which occur certain larger cells known as *heterocysts*. The cell-walls secrete such abundant mucilage that numerous cell-chains become imbedded together in structureless masses of jelly, which may attain the size of a plum or larger, and are found floating in the water or attached to other bodies.

NOTACANTHIDÆ, a family of elongated fishes, living in the cold, deep oceans. They have nothing of popular interest connected with them.

NOTATION, algebraic. See **ARITHMETIC**, Vol. II, pp. 524-527. For astronomical notation, see **COMET**, Vol. VI, pp. 182, 183. For chemical notation, see **CHEMISTRY**, Vol. V, p. 472. For musical notation, see **MUSIC**, Vol. XVII, p. 80.

NOTHINGARIANS OR **GORTONIANS.** See **GORTON, SAMUEL**, in these Supplements.

NOTIDANIDÆ, a family of sharks, characterized by having more gill-clefts than ordinary sharks. The representatives are inhabitants of the warmer seas. *Notidanus*, the type-form, is the cow-shark of warm, temperate waters. See **SHARKS**, Vol. XXI, p. 778.

NOTOCHORD. See **SKELETON**, Vol. XXII, p. 110.

NOTOPTERIDÆ, a family a fresh-water fishes. See **ICHTHYOLOGY**, Vol. XII, p. 694.

NOTORNIS, a bird of the family of rails, which formerly inhabited New Zealand. See **MOOR-HEN**, Vol. XVI, p. 809; and **BIRDS**, Vol. III, p. 732, note.

NOTRE DAME, UNIVERSITY OF, a Roman Catholic institution located at South Bend, Indiana; founded in 1844 by the Rev. Edward Sorin, and conducted by the members of the Congregation of the Holy Cross. It is the largest, and possibly the most important, of the Roman Catholic universities in the United States. It has a roll of 42 professors and instructors, and usually about 600 students. The library has about 50,000 volumes; the value of the scientific apparatus is \$35,000, and of the property \$800,000. The institution is conducted independently of all endowment, the sole revenues being derived from the fees, the annual charge to each student being \$300. The courses embrace the classics, mathematics, science, law and fine arts. Phonography, telegraphy and typewriting are also under the care of competent instructors. The scientific side provides special advantages for the study of natural and physical sciences, mechanical engineering and applied electricity.

NOTT, ELIPHALET, an American clergyman; born in Ashford, Connecticut, June 25, 1773. He

graduated at Brown University; studied theology from 1798 to 1804; was pastor of the First Presbyterian Church at Albany, and in 1804 was elected president of Union College, Schenectady, New York. Through his efforts the legislature passed a law, in 1814, by which financial aid was afforded this college by means of lottery, the management of which was



REV. ELIPHALET NOTT.

confided to himself and conducted by him for many years. He endowed the college with property worth five hundred thousand dollars. He obtained about thirty patents for inventions. The most notable of these was for the first stove for burning anthracite coal, which bore his name and came into general use. Among his published writings are *Counsels to Young Men*; *Lectures on Temperance*; and *Resurrection of Christ* (1872). His speech on the death of Alexander Hamilton is regarded as a classic. He died in Schenectady, New York, Jan. 29, 1866.

NOTTINGHAM, the chief town of Nottinghamshire, England, has been considerably enlarged in its municipal boundaries since the writing of the account in Vol. XVII, pp. 559-600. By an act of Parliament passed in 1877, the boundaries of the town were extended, and now include Lenton, Radford, Basford, Sneinton, Bulwell, the Park, Carrington, Sherwood, Brewhouse Yard and parts of Wilford and Gedling. The population of the county borough, co-extensive with Parliamentary borough,

is 213,877. The area of the borough is 10,935 acres. Besides a town and county hall, an exchange, St. Mary's, and several other churches and places of worship, Nottingham has a grammar school, a free library, a natural history museum, university buildings (built at a cost of one hundred thousand pounds, and opened in 1881), a school of art, an arboretum, a spacious theater; several fine public halls, including the Albert, seating about three thousand persons; a Gothic fountain, erected as a memorial of John Walter of the *Times*, for a short time member of Parliament for the town; and a statue of the late Samuel Morley who also represented Nottingham in Parliament; high schools for boys and girls, middle schools and 57 primary schools, Blind Institution, Art Museum, free public libraries, Mechanics' Institute, People's Hall (founded by G. Gill). Here is produced nearly all the British machine-made lace. For making machines for the lace trade there are, in Nottingham, shops and large factories. The markets for corn and cattle are among the largest held in the midland counties. Several fairs take place annually, the most important being the "Goose Fair" in October. There is a fine race-course to the northeast of the town. Nottingham publishes four daily newspapers. The Parliamentary borough is divided into three districts, each of which returns one member: East Nottingham, population, 69,794; South Nottingham, 62,046; and West Nottingham, 82,037. The castle, fired by rioters, Oct. 8, 1831, on the rejection of the Reform Bill by the House of Lords, remained a ruin till 1877, when the property was leased to the corporation of Nottingham for five hundred years, and was restored at a cost of thirty thousand pounds for the purposes of a Fine Arts Museum, opened in 1878.

NOUKHA, a town of Russia, in Transcaucasia, built on the southern slope of the Caucasus Mountains, 80 miles S.W. of Derbend. It is inhabited by native Tartars belonging to the Mohammedan creed, by Armenians, and a few Russians, chiefly officials. Breeding the silk-worm is the staple branch of industry. The native breed of silk-worms is somewhat coarse, and is now being supplanted by the Italian breed.

NOVACULITE, an exceedingly compact form of hornstone which is used as a hone or whetstone for sharpening knives. See also MINERALOGY, Vol. XVI, p. 389.

NOVALES, the pseudonym of HARDENBERG, FRIEDRICH VON, Vol. XI, p. 472.

NOVA SCOTIA, called by the French Acadia, and now one of the maritime provinces of the Canadian Dominion, for an account of which see NOVA SCOTIA, Vol. XVII, pp. 601-603. Much of the land is still covered by forests, which produce much fine timber, and there are large and valuable coal-deposits, which form a considerable source of the provincial revenue. Along the shores of the Bay of Fundy there are rich dike-lands, which have been cultivated for centuries by the Acadians and their modern French and Scottish descendants, and where the apple and other fruits flourish. The transportation facilities of the province are still mainly those of the steamship lines, there being but 825

miles of railway. The Intercolonial railroad, which has its eastern terminus at Halifax, connects the province with the west. The population, in 1891, was 450,396, of whom 122,452 are Roman Catholics. The Presbyterians come next, with a membership of 108,520.

Though there is now a school of agriculture in Nova Scotia, farm products are not much of a source of revenue. Wheat is cultivated but little. Hay, oats and potatoes are the chief products raised. In 1891 the hay-yield was 63,000 tons; oats yielded 1,500,000 bushels, and the potato crop exceeded 5,000,000 bushels. In the same year there were 9,000,000 pounds of butter and 600,000 pounds of cheese manufactured. The yield of wool was over a million pounds, while the apple crop of the year exceeded 1,000,000 bushels. The following are the census returns of the live-stock on farms for 1891: Horned cattle, 309,776; horses, 62,419; sheep, 318,885; swine, 45,760.

The fisheries are a large and profitable industry in Nova Scotia. The number of men engaged in this pursuit in 1894 was close upon 6,000 in vessels and 20,000 in boats, with a total investment in the trade of \$3,500,000. The value of the fish-catch of the province was, for 1894, \$6,500,000, of which \$5,000,000 worth was exported. The chief catch was of cod, lobsters, herring and mackerel. The increase in this trade in the last ten years was in value \$871,000.

Coal-mining is the most important industry of the province, the output of which was, for the year 1894, nearly 2,500,000 tons. The production of this commodity during the last twenty years exceeds 32,000,000 tons. Much of the current output is sold to the neighboring provinces, and about ten per cent is exported to Newfoundland and other countries. Gold-mining is another profitable industry in the province, the yield from which, between the years 1862 and 1894, was, in round figures, 15,000 ounces from 40,000 tons of quartz crushed. The average yield in value is about \$14.50 a ton. The area of the provincial gold-measures has been estimated to be from five to seven thousand square miles. There are 35 localities in the province in which workable deposits of gold have been found, and from three thousand to four thousand persons are engaged in or dependent on the industry. The returns show that as yet only forty square miles has been worked partially, from which \$11,000,000 worth of the metal has been mined since the discovery of the gold.

The other industries of Nova Scotia are ship-building, fish-canning, sugar-refining, and the manufacture of woollen goods, cotton duck, glassware, boots and shoes, gunpowder and other explosives. The annual revenue of the province is about \$900,000, half of which is the Dominion subsidy; while about \$250,000 is raised annually from a tax on the mines. The provincial debt has nearly trebled in the last ten years; the gross debt in 1894 was a little over \$3,000,000, with total assets of one and a third millions. The province has a legislature of 38 members, including an executive of 6 ministers, of whom 3 are without portfolios.

They represent the population of 18 counties. There is also a legislative council of twenty members. Nova Scotia is represented in the Federal Parliament by 10 members in the Senate and 21 members in the Commons. Education in the Province is represented by 6 colleges, 1 normal school and 2,290 common schools. The latter are supported by direct taxation upon the municipalities and by an annual government grant averaging \$220,000, or of \$736,000 for the whole purposes of education. The enrolled attendance in the public schools in 1894 was 98,710, and the average attendance 51,152.

NOVA SCOTIA SHIP RAILWAY. See CHIGNECTO BAY, in these Supplements.

NOVEL. See ROMANCE, Vol. XX, pp. 632-661.

NOVELLO, JOSEPH ALFRED, an English organist, composer and musical publisher; born in London in 1810. He was the eldest son of Vincent Novello (born 1781). The father rose to a high position in the English musical world, and had three daughters, Cecilia, Mary and Clara, the last being the greatest oratorio singer of modern times, becoming Countess Gigliucci in 1843. The father published editions of sacred music as early as 1811. At the age of 19, Joseph Alfred established himself as a musical publisher, and shortly afterward invented a process of printing music which revolutionized the sale of cheap music. He was a friend of Felix Mendelssohn, and in 1847 published *The Messiah* and *The Creation*, and adapted the English text to the *Lobesang* and *St. Paul*. These works were issued at low prices. The house has published 67 oratorios and many works of the standard composers at the uniform price of one shilling, produced in the best manner, equaling any work turned out by continental firms. His house became the greatest music-publishing house in the world, and to him can be given the credit of first bringing music within the reach of "the masses." To him was due the abolition of the printers' guild law, and he was actively engaged in the repeal of the advertisement duty, the paper duty, the stamp on newspapers, and other imposts known as "taxes upon knowledge." He aided Bessemer in producing the metal known by the name of the latter. In 1856 he retired from business and went to reside at Nice, whence he removed to Genoa. In Italy he was made one of the four commissioners to look after the interests of the British shareholders in the Italian Irrigation Company (Cavour canal), involving £5,000,000 of British money. He devoted much attention to the construction of ships, and published an *Epistle to Naval Architects*. He died in Genoa, July 17, 1896.

NOVOROSSICK, a seaport town of Russia, on the E. coast of the Black Sea, 30 miles S.E. of Anapa; is the terminus of a railway opened in 1888. The town is built on a slope terminating in lofty heights, and is defended by forts. Population 1890, 10,000.

NOYES, JOHN HUMPHREY. See ONEIDA COMMUNITY, Vol. XVII, p. 772.

NUBAR PASHA, an Egyptian statesman; born in Smyrna in 1825, of an Armenian Christian family.

He was educated in Switzerland and in France. In 1842 he became secretary of Bogos-Bey, who was then Minister of Foreign Affairs in Egypt. Two years later he was made secretary-interpreter to Mehemet Ali, and afterward to Ibrahim Pasha. In 1866 Ismail Pasha made him Minister of Foreign Affairs, and sent him to Constantinople to obtain from the Sultan the title of Khedive for himself. Nubar Pasha's efforts were directed to introducing European customs into the administration of Egyptian affairs. In 1878 he became president of the Egyptian Cabinet. But he was compelled to resign after six months. In 1884 he was called to the head of affairs again, when his administration proved even more acceptable to the Egyptians than before. He came into collision with the British policy, and as a result of his financial recommendations was dismissed by Tewfik, June 8, 1888. He was recalled in 1894 by the new Khedive, Abbas Hilmi, son of Mohammed Tewfik. The Premier resigned Nov. 11, 1895, on account of failing health, having been in the service of the state 53 years.

NUBIA. See AFRICA, in these Supplements.

NUCLEOBRANCHIATA, a group of mollusks. On grounds of priority, the term *Heteropoda* is now adopted. See HETEROPODA, in these Supplements.

NUCLEO-PLASM. See HEREDITY, in these Supplements.

NUCLEUS, in botany, one of the essential organs of a plant-cell. It is usually a roundish body, imbedded in the cytoplasm, and consists of a variety of proteid substances. In its resting-stage it is bounded at the surface by a membrane, and consists of a semi-fluid clear ground-substance (*paralinin*), in which lies a fibrillar network of denser substance (*linin*), in which are distributed granules of *chromatin*. Other bodies lying in the ground-substance are known as *nucleoli*, whose history is still problematical. In ordinary cell-division the nucleus passes through a remarkable series of changes, which have been described under KARYOKINESIS in these Supplements.

NUCLEUS, of the Earth. See GEOLOGY, Vol. X, pp. 223-227.

NUDIBRANCHIATA, a group of opisthobranchiate gastropod mollusks, which have no mantle or shell. Gills are sometimes present, and hang freely into the water, hence the name, signifying naked gills. The larval form possesses a shell. Most of these mollusks live near the shore. The group contains numerous species, mostly in the warm seas. *Doris*, *Æolis* and other genera are common along the coasts of the United States.

NUEVO LEON, a state of eastern Mexico, included within the states of Tamaulipas on the northeast and east, San Luis Potosi south and southwest and Coahuila west and north, having an area of 23,592 square miles. It is traversed by the eastern Sierra Madre, running from northwest to southeast, and is watered by three principal rivers, the Salado in the north, the Sans Juan in the center and the Del Tigre in the south. A considerable part of the territory on the southwest of the Sierra is in the Mexican plateau, having an elevation of about 6,000 feet. On the northeast slope of the mountains there are low lands or plains extending

toward the Rio Grande. The climate varies with the elevation, being mild and agreeable on the mountain slopes and the plateau, and hot and unhealthy in the low lands. The products, largely agricultural, include maize on the plateau and sugar-cane in the lower districts. The mineral wealth of the state is considerable, but the mines are not extensively worked. The population, a large part of which resides along the northeastern slope of the Sierra, was estimated in 1893 at 294,000.

NUISANCE, in law. See NUISANCE, Vol. XVII, pp. 612, 613; and ABATEMENT, in these Supplements.

NULLIFICATION, in the history of the United States, the action of the legislature of South Carolina, in 1832, declaring certain acts of Congress unconstitutional, and therefore null and void. See CALHOUN, Vol. IV, p. 683; and WEBSTER, Vol. XXIV, p. 472.

NUM or NUMRA, an Egyptian diety. See EGYPT, Vol. VII, p. 716.

NUMBERING—MACHINE. Blank-book manufacturers and printers use a variety of machines for consecutively numbering the pages of account-books, tickets of admission and the like. The most simple are in the form of a hand-stamp, bearing figure-wheels below. With these, pressure on the handle brings down the wheels so that a number is printed. A spring then automatically turns one of the figure-wheels, so that the next consecutive number is brought into place, and with the same motion the figures are inked for another impression. The larger machines work on similar principles, but are operated by treadle or power, while the work to be numbered is fed in, somewhat as in a treadle printing-press.

NUMIDIDÆ, a family of African birds, including the well-known guinea-fowls. The heads are bare, crested, or with a small feathered patch. The birds are noted for their peculiar shrill voice. The common domesticated guinea-fowl is *Numida meleagris*. See GUINEA-FOWL, Vol. XI, p. 264.

NUMMULINIDA, a family. See FORAMINIFERA, Vol. IX, pp. 380-384.

NUNCIO. See AMBASSADOR, Vol. I, p. 657; and LEGATE, Vol. XIV, p. 413.

NUNDA, a village of Livingston County, central western New York, 18 miles S.W. of Geneseo, on the Erie and the Western New York and Pennsylvania railroads. It has furniture, shoe, knife and casket factories; is on the Genesee Valley Canal, and is a summer resort. Population 1890, 1,010.

NUNEZ, RAFAEL, a South American statesman; born in Cartagena, Colombia, Sept. 28, 1825; was elected to the Colombian Congress from Panama in 1851, and from 1855 to 1857 was Secretary of the Treasury. He afterward resided in New York, editing a Spanish journal, and from 1865 to 1874 was Colombian consul at Harve and Liverpool successively. In 1875 he was defeated for the Presidency of Colombia, but became governor of the state of Bolivar; served in 1878 in the Colombian Senate, and in 1879 was elected President of the United States of Colombia. He was re-elected in 1884 and was retained in office till his death, which occurred at Bogota, Sept. 18, 1894.

NUNIVAK, an island of Alaska, in Bering Sea, off Cape Vancouver, lat. 60° N., long. 165° to 167° W.; length of island, 70 miles, and about 30 miles wide; peopled by Esquimaux, who trade in fox-skins, oil and ivory.

NUN OF KENMARE, THE. See CUSACK, MARY FRANCES, in these Supplements.

NUR-ED-DIN, MAHMOUD MALEK-AL-ADEL, a Sultan of Syria, the son of Zengui, or Omad-ed-din, who ruled over northern Syria; was born in Damascus in 1117, and obtained the sovereignty of Aleppo on the death of his father by poisoning at the hands of the eunuchs, at the siege of Jabbar in 1145. He resisted the Christian crusaders, defeated Joscelin de Courtney, Count of Edessa, and Raymond, Prince of Antioch, whose head he sent as a trophy to the caliph at Bagdad. He then made himself master of Damascus. As a ruler he exhibited the quality of prudence, and as a warrior he was one of the heroes of the Moslem faith. He was a patron of the arts and sciences, and founded cities, establishments of learning, hospitals and mosques. The first employment of pigeons as carriers of messages has been ascribed to him. He died suddenly at Damascus, while preparing to set out for Egypt, in the year 1173. For his struggle with the Templars, see TEMPLARS, Vol. XXIII, p. 161; and for his operations in Egypt, see EGYPT, Vol. VII, pp. 752, 753.

NURSERY CULTURE. See ARBORICULTURE, Vol. II, pp. 321, 322.

NURSE—SHARK, a local name for sharks of the genus *Somniosus*. They are large fishes of the cold northern seas. The name probably refers to their habit of resting or basking for long periods of time. Some of these sharks reach a length of twenty feet. A smaller shark (*Ginglymostoma*) of the tropical Atlantic has been sometimes called nurse-shark.

NURSING. (For preliminary account, see HOSPITAL, Vol. XII, p. 305.) Fifty years ago a well trained and qualified nurse was almost unknown, and consequently the care of the sick often devolved upon persons totally unfit for and ignorant of the duties required of them. That time is fortunately passed. Well-educated women are now to be obtained from various institutions at moderate rates,—women who are regarded by medical attendants as most valuable assistants.

One of the earliest, if not the very first, of the training institutions for nurses of a superior class, was the St. John's Sisterhood, founded in 1848 in London. It is now, with its affiliated institution, the Nursing Sisters of St. John the Divine, under the patronage of the Archbishop of Canterbury, and has a very influential council or committee, and a large staff of nurses, some of whom are laboring gratuitously amongst the poor. Much care is taken in their selection, and they are trained carefully.

After the Crimean War, a great impulse was given to the movement, in commemoration of the heroic self-denying labor of Miss Florence Nightingale (q.v., in these Supplements), and a fund was raised for the purpose of training hospital nurses. In 1887, Queen Victoria devoted the surplus of the Women's Jubilee Offering, amounting to \$350,000,

to the foundation of a scheme for the training of nurses. The interest of this sum, about \$10,000, is employed in the maintenance of central institutions, where nurses are trained for this special work. There are, at present, four of these centers,—in London, Edinburgh, Dublin and Cardiff. Nurses who have gone through the required training at any of these homes are eligible to be entered on the roll of the Queen's Institute, and are entitled to wear the badge as Queen's nurse.

The army and navy nurses of Great Britain must all be women of good social position, and are required to undergo three years' training in a general hospital. They are called Her Majesty's Nursing Sisters, and may be ordered on active service in any war. As a reward for special service they receive the order of the Royal Red Cross. The Royal National Pension Fund, an insurance company for nurses, was founded in 1887. In 1889 four English gentlemen placed \$100,000 at the permanent disposal of the fund, to afford nurses a safe means of providing an allowance during sickness and a certain income when their strength is declining. On the continent of Europe the employment of male nurses to attend male patients is common, and in the Roman Catholic countries the nursing of the hospitals is for the most part in the hands of Sisters of Mercy. In Germany a great impetus was given to improvements in nursing by the interest shown in the matter by the late Empress Augusta, the Empress Frederick and the late Princess Alice of Hesse. The training of nurses on the lines adopted in Great Britain was instituted in Paris during 1877, by the establishment of *L'École de Garde-malades et d'Ambulancières*. In America the practice of nursing is very thoroughly taught in many of the hospitals, particularly those in the Northeastern states, such as the Bellevue Hospital in New York, the Long Island Hospital in Brooklyn, the Philadelphia and Pennsylvania hospitals in Philadelphia, and many others.

One of the leading Western schools is the Illinois Training-School, in Chicago. This school is a large one, giving the fullest training possible, both practical and theoretical. Class-instruction is given by the superintendent and her assistants, and lectures by some of the most prominent physicians of the city. The practical training is obtained in the private rooms, wards and operating-rooms of the Presbyterian and Cook County hospitals, embracing the care of medical, surgical, gynecological and obstetrical patients, the care of sick children, and special or private duty nursing. The practical work is supervised by the officers of the school and by the head nurses, many of whom are graduates. The number of pupils is generally about 130, varying a little from month to month; besides the pupils, there are 12 graduate head nurses and from 10 to 20 probationers.

The work of a nurse is very hard, but, by judicious arrangement of the hours of work, recreation, sleep and meals, this is in a large measure compensated for. The three years' course was inaugurated in June, 1896, by means of which it is hoped that the strain of the hardest mental and physical work,

which used to come at the same time, will be lessened. All training-schools for nurses in the country have improved greatly in all respects during the last ten years, particularly in the theoretical instruction and the details of practical work. Discipline is an important point in the training of nurses; it is also a great advantage to have the home in a building apart from the hospital where the work is done, thereby giving the nurses greater relaxation when off duty and taking them entirely away from the atmosphere of sick people. Every large city has several schools, and many of the smaller cities have at least one. Some of these give training in only one or two branches, others in all but one or two, while comparatively few give a complete course, embracing all branches.

It is quite evident that the results of the establishment of training-schools for nurses to care for the sick in hospitals has been most satisfactory, because the number has increased constantly and rapidly. The best proof of this is the fact of the increasing demand for graduates of training-schools to care for the sick in their own homes, and to take charge of new schools and hospitals, or to fill the places of non-graduates who have formerly held hospital positions. The profession supports a weekly journal, *The Trained Nurse*, published in New York City.

The following gives a synopsis of the three years' course of the Illinois Training-School:

Class-Work. Elementary anatomy and physiology, *materia medica*, and practical nursing, embracing the whole care of ordinary medical, surgical and gynecological patients, with text-books, models and demonstrations.—*Lectures.* On hygiene, anatomy and physiology; on *materia medica*, bacteriology; on surgical, medical and gynecological nursing.—*Cooking Lessons.* Practical and theoretical work.—*Class-Work.* Obstetrical nursing, care of the new-born, care of children, special nursing, care of operation patients, private duty, surgical technique and operating-room work.—*Lectures.* Obstetrics, special gynecological work, the care of sick children, the examination and testing of urine, care of the nervous and insane, advanced medical and surgical subjects. No class-work.—*Lectures.* Eye, ear, throat, skin, electricity, massage, training-school administration. During the senior year nurses will serve as head nurses, and special nurses to private patients in the Presbyterian Hospital. It is designed to finish as nearly as possible the theoretical training during the first two years, thus relieving special and head nurses of that excessive mental application heretofore demanded by the shorter course.

NUSAIRIEH. See ANSARS, in these Supplements.

NUTATION, a term in physiological botany to denote certain spontaneous changes in the position of growing-points,—a movement common to all growing-points, but especially noticeable in slender structures, such as tendrils. By reason of this nutation the path described by the growing-point is not a straight line, although the axis of the organ may become permanently straight, but a spiral whose section is circular or elliptical. In the case of flat organs, such as a leaf, the path of the nutating growing-point is a zigzag line.

NUTATION. Of the equinoxes, see ASTRONOMY, Vol. II, pp. 794, 795. Of tides, see Vol. XXIII, pp. 361, 362. In geology, see Vol. X, pp. 225-227.

NYACK, a village of Rockland County, southeastern New York, on the west bank of the Hudson,

at the upper end of the Palisades, about 28 miles from New York, on the Erie and the New York, Ontario and Western railroads; contains Rockland College (non-sectarian), organized in 1874; Nyack Seminary (Protestant Episcopal); Nyack Library, founded in 1879; and manufactories of shoes, pianos, pipe-organs, steam-yachts, engines, paper boxes and boilers. Population 1890, 4,111.

NYANGWE, an Arab trading station on the Upper Congo, or Lualaba, at the edge of the Man'yema country, in $4^{\circ} 13' S.$, $26^{\circ} 21' E.$ From that point Henry M. Stanley commenced the descent of the Lualaba in 1876.

NYASSA OR NYANJA, the southernmost of the equatorial great lakes of East Africa, situated about 260 miles S.E. of Tanganyika and 400 inland from the east coast. It lies at an altitude of 1,575 feet, is very deep in the middle, and shelves rapidly from the shores, which are rocky and high. Long and narrow, it measures 250 miles from north to south, and an average of 50 miles from east to west and has an extreme depth of 100 fathoms. The river Shiré emerges at its southern extremity, and flows south to the Zambesi. The waters of the lake are sweet, and abound in edible fish. Although the Portuguese had knowledge of the existence of the lake under the name of Maravi early in the seventeenth century, Livingstone was the first to fix, in 1859, its exact situation and to navigate it. He found a numerous population in the mountains (which rise from 10,000 to 12,000 feet above the level of the lake), growing maize, cassava, tobacco and English peas, which has been introduced by Arab traders.

NYĀYA PHILOSOPHY. See SANSKRIT, Vol. XXI, p. 291; and BRAHMANISM, Vol. IV, p. 209.

NYCTAGINACEÆ, a family of dicotyledonous plants characterized by the funnellform or tubular calyx, colored like a corolla, and falling away from a persistent lower portion, which completely closes over the seed-like fruit, and in some genera becomes winged. The species are found especially in the tropics of South America. The best-known genera is *Mirabilis*, whose species, known as four-o'clocks, are extensively cultivated as ornamental plants.

NYCTITROPIC, a term in physiological botany to denote certain movements of leaves, by which they shift their position so as to vary the surface-area presented to the sky. As these movements are usually associated with the alternation of day and night, they are called sleep-movements or nyctitropic movements. The nyctitropic movement, caused by diminished intensity of light and falling temperature, reduces the surface-exposure of the leaves, either by presenting their edges to the

zenith, or, in compound leaves, by folding the leaflets together.

NYE, EDGAR WILSON, an American humorist; born in Shirley, Maine, Aug. 25, 1850. At the age of two years his parents removed to St. Croix County, Wisconsin, and the boy received his early education at Rivers Falls. He studied law and went to Wyoming territory in 1875, and was admitted to the bar the following year. From an early period he contributed sketches to the local papers, and in 1880 was invited to contribute to the *Tribune* of Denver, Colorado. The next year he established, at Laramie, *The Boomerang*, in which he "wrote up" that town in the style characteristic of "Bill Nye," the name by which he was always known in the press. This effort inverted the usual proportions and order of things, exaggerating the small things, such as a peanut-stand into a mammoth enterprise, and minimizing the greater institutions and persons, and so on. The inhabitants were sensible enough to enter into and enjoy the joke, and showered honors on the genius who had drawn attention to their town. While editing *The Boomerang*, he was made a justice of the peace, postmaster, school superintendent, United States commissioner and a member of the legislature. *The Boomerang*, however, had not scope enough in Laramie, and Nye was obliged to suspend its publication. He returned to Wisconsin, and lived and wrote in Hudson for some years, when he was enticed to New York to work on a salary which to him appeared fabulous. His first book was published at Chicago in 1881, its title being *Bill Nye and The Boomerang*. He then entered into an arrangement with James Whitcomb Riley for a joint lecturing tour. He also appeared as a playwright in 1891, when *The Cadi* was produced at Union Square Theater, in New York City. He also wrote *The Stag Party*, in collaboration with Paul Potter. His other works are *The Forty Liars and Other Lies* (1883); *Baled Hay* (1884); *Bill Nye's Blossom Rock* (1885); *Remarks by Bill Nye* (1886); *Bill Nye's Thinks* (1888); *Bill Nye's History of the United States* (1894). *Bill Nye's History of England* was the latest work he produced. He died in Asheville, North Carolina, whither he had gone for his health, Feb. 22, 1896.

NYKÖPING, a seaport of Sweden, 62 miles S.W. of Stockholm; manufactures machinery, cotton, steamboats, locomotives, steam-engines and cloth; port has a depth of 13 feet at entrance; the quay has a length of 1,213 feet. The castle, now ruined, ranked in point of strength next to those of Stockholm and Calmar. King Waldemar was imprisoned here after his dethronement in 1288 till his death in 1302. Population 1890, 6,000.

NYMPHON, a genus of insects. See ARACHNIDÆ, Vol. II, p. 277.

OAK, the common name of species of *Quercus*, a genus of forest trees too well known to need extended description. Their variable but usually lobed leaves, their characteristic fruit, the acorn, and their valuable wood, have made them familiar plants to all nations and throughout history.

OAKELEY, **SIR HERBERT STANLEY**, an English composer, the second son of Sir Herbert Oakeley; born in Ealing, Middlesex, July 22, 1830. He was educated at Rugby School and at Christ Church, Oxford, (B.A. 1853, M.A. 1855). After having graduated he went abroad to complete his studies in music, for which, from earliest childhood, he had shown a marked predilection. At Leipsic he studied pianoforte-playing under Professors Moscheles and Plaidy, and at Bonn organ-playing under Dr. Breidenstein, professor of music in that university, and afterward under the great organist Dr. Johann Schneider of Dresden. While resident in London he acted for some years as musical critic and correspondent. In 1864 he was enrolled in Rome as member of the Society of "Quirites." In 1865, on the death of Professor Donaldson, he was elected professor of music in the University of Edinburgh. In 1871 he received the degree of doctor of music from the Archbishop Tait of Canterbury. In recognition of musical services for Scotland, the honor of knighthood was conferred on him in August, 1876. In 1879 his own university, Oxford, gave him the degree of Mus. D., *honoris causâ*; and in 1881 that of LL.D. was presented to him by the University of Aberdeen, and in the same year he was created composer for the Queen in Scotland. In 1887 he received the degree of Mus. D. from Dublin University. He wrote for the church, for chorus, orchestra, organ and pianoforte, and published vocal quartets, etc., including a *Jubilee Album*, dedicated to the Queen, and a *Jubilee Cantata* (1887). He originated the Reed concerts in Edinburgh, and prepared a scheme for musical graduation in the University of Edinburgh.

OAK HARBOR, a village of Ottawa County, northern Ohio, near Port Clinton, 15 miles from Sandusky, on the Portage River and the Lake Shore and Michigan Southern railroads; has saw and planing mills, and manufactures of sashes, blinds, wagons and lumber. Population 1890, 1,681.

OAKLAND, a city of Alameda County, California. It is essentially a residence city for San Francisco business men, and hundreds of fine residences are to be seen just outside the business portion of the town. The transportation facilities include both street-cars, the Southern Pacific railroad and ferry-boats.

The following figures taken from the census of 1890 will show something of the business of Oakland: Number of mechanical and manufacturing industries reported, 342; aggregate capital invested,

\$6,629,468; average number of employees, 4,438; total amount of wages paid, \$3,090,007; total value of products, \$9,112,778. In 1890 there 15 public schools, 2 colleges, the Pacific Theological Seminary (Congregational), 7 private academies, a private normal school, 8 libraries and 4 daily papers. Population 1890, 48,682. See also **OAKLAND**, Vol. XVII, p. 694.

OATES, **WILLIAM C.**, an American public man; born in Pike County, Alabama, Nov. 30, 1835. He was self-educated, studied law, was admitted to the bar in 1858, and became a successful lawyer and business man; entered the Confederate army as captain of Company G, Fifteenth Alabama Infantry, in July, 1861; was appointed colonel in the provisional army of the Confederate States, May 1, 1863, and was assigned to the command of his old regiment; the Forty-eighth Alabama Regiment also was placed under his command subsequently. He was wounded four times slightly and twice severely, losing his right arm in front of Richmond, Aug. 16, 1864, in the twenty-seventh battle in which he was engaged. In 1868 he went as a delegate to the national Democratic convention held in New York which nominated Seymour for the Presidency; was a member of the Alabama house of representatives and chairman of the committee on ways and means at the sessions of 1870-71 and 1871-72. He was a member of the constitutional convention in 1875, and chairman of its judiciary committee; and was elected to Congress for the Third Alabama District in 1881, and served several subsequent terms.

OATS, the popular name of *Avena sativa*, or of its grain, a grass of the Old World, whose cultivation is recorded from the most ancient times. It is soft and smooth, with a loose panicle of large drooping spikelets, one flower of which has a long twisted awn on the back.

OATS IN THE UNITED STATES. See **AGRICULTURE**, in these Supplements.

OAXACA, a state of Mexico, bounded on the south by the Pacific Ocean and west by Guerrero and Puebla, north by Vera Cruz and east by Chiapas. It covers an area of 28,778 square miles, and is for the most part mountainous, the principal range being that of the Sierra Madre del Sur, which crosses the whole state from east to west, and with peaks 1,200 feet high. The principal rivers of the state are the Chacalapa and the Tehuantepec. The soil is generally fertile, and sugar, cotton, indigo and maize are the best crops. Mining has not as yet been thoroughly developed, but it is said valuable gold-mines abound. The population, of whom about seven eighths are civilized Indians, numbered in 1893 about 815,460.

OAXACA, a city and the capital of the state of

Oaxaca, situated in the center of the state, at the foot of the Sierra Madre del Sur; the seat of a bishopric, and has a theological institution and a good public library; also a fine cathedral. Population 1889, 28,500.

OB OR OBI, a bay and river of SIBERIA; q.v., Vol. XXII, p. 5.

OBAN, a seaport town on a bay of the same name, in Argyleshire, Scotland, on the Sound Kerrera, 20 miles N.W. of Inverary, a terminus of the Caledonian railroad; a place of call for coast excursion steamers; has manufactures of silk and straw hats, and exports whisky, fish, pig-iron, wool, kelp and slates; has a fine harbor, with twenty fathoms of water, and a pier 250 feet long and 30 feet wide; is a great resort for tourists. It has fine hotels and many villas on the heights overlooking the town. To the north are the ruins of Dunolly Castle, and three miles away is Dunstaffnage Castle, a place of very early Scottish kings. Oban is a Parliamentary borough, and its scenery is enchanting. Population, about 5,000.

OBEID, EL. See EL OBEID, Vol. VIII, p. 153.

OBERLIN, a village of Lorain County, northern Ohio, 7 miles S.W. of Elyria and 35 miles W. of Cleveland, on the Cleveland, Lorain and Wheeling and the Lake Shore and Michigan Southern railroads; the seat of Oberlin College (non-sectarian), a co-educational institution founded in 1833. It had, in 1896, 88 instructors, 1,422 pupils, a library containing 42,286 volumes, and a valuable museum and herbarium. Population of village 1890, 4,376.

OBERLIN COLLEGE, a non-sectarian co-educational institution located at Oberlin, Ohio. It was founded in 1833 as a private institution, and chartered in 1834 as Oberlin Collegiate, and



PETERS HALL, OBERLIN COLLEGE.

in 1850 as Oberlin College. It is divided into the theological, collegiate and preparatory departments. Especial attention is given the instruction in music. The theological department is not under the direct control of any denomination, but indirectly is associated with the Congregationalists. In 1895 the productive funds

amounted to \$947,350, and the annual income was about \$140,000. There are 1,422 students in attendance, with 88 instructors and 43,000 volumes in the library.

OBESITY. See CORPULENCE, Vol. VI, pp. 435, 436; and PATHOLOGY, Vol. XVIII, pp. 389, 390.

OBLATES, the name of a class of religious bodies in the Roman Catholic Church, which differ from the religious orders, strictly so called, in not being bound by the solemn vows of the religious profession. The instituting of oblates was one of the many reforms introduced in the diocese of Milan by St. Charles Borromeo, toward the close of the sixteenth century. The members consisted of secular priests who lived in community, and were merely bound by a promise to the bishop to devote themselves to any service which he should consider desirable for the interests of religion. St. Charles made use of their services chiefly in the wild and inaccessible Alpine districts of his diocese. The oblates in the United States are numerous. There are four distinct orders of oblates: Oblates of St. Charles, the order just described; Oblates of St. Francis of Rome, an order of women organized in 1433; Oblates of Italy, an order of priests in charge of Eastern Burmah, founded in 1816; and Oblates of Mary Immaculate, a society of priests organized in 1815, a numerous order of a general nature, similar to the Oblates of St. Charles.

OBLIGATION, DAYS or, holidays on which faithful Catholics are bound to abstain from servile work, and hear mass. These are, for the United States, Circumcision, Epiphany, Annunciation, Ascension, Corpus Christi, Assumption, All Saints, Immaculate Conception and Christmas day. In some Western dioceses the Circumcision, Epiphany, Annunciation and Corpus Christi are excepted.

OBLIGATION OF CONTRACTS, a phrase occurring in the constitution of the United States, out of which unexpected and the gravest consequences in jurisprudence have issued. The clause in question recites that "no state shall . . . pass any . . . law impairing the obligation of contracts." (Art. I, sec. 10, subd. 1.) At the time of framing the constitution the phrase was comparatively new, and had not the definitive sense that long adjudicated law-expressions have. However, in the different states, much trouble had arisen from laws depreciating the currency, and making it, or even property, legal tender for debts, and otherwise hindering the enforcement or modifying the effects of private engagements. Such legislation affected not only the citizens of the state making such enactments, but the citizens of other states doing business with them. In the ordinance of 1787 creating the Northwest Territory, with a view to such conduct it was provided that "no law ought ever to be made in said territory that shall in any manner whatever interfere with or conflict with private contracts, or engagements *bona fide* and without fraud previously formed." The phrase went, without serious discussion, into

the fundamental law of the land, and probably with no clearer or larger intent than to protect the sacredness of engagements between man and man from legislative encroachment. From the fact that the constitutional prohibition is imposed only on states, the inference is that Congress may enact laws of such purport within the limits of its powers. If Congress exceeds its express powers with a statute that changes the nature of a contract, such legislation would be unconstitutional. It was on this ground that Chief Justice Chase held the legal-tender clause on United States notes to be *ultra vires* of Congress.

This very simple doctrine of honest dealing received a momentous expansion in 1819, at the hands of the supreme court. The case is famous and memorable as the "Dartmouth College case." In 1815 the trustees removed President John Wheelock from his office in the college. He sued in the courts for restoration, but the legislature intervened in 1816, created a new corporation and changed the name to Dartmouth University, and Wheelock was replaced. The ousted trustees went into the state courts for possession, and were defeated. Thereupon they appealed to the United States courts, retaining Jeremiah Mason and Daniel Webster as counsel. In preparing his brief for the supreme court, Mr. Webster fortified his main argument by the novel side issue that a charter was a contract, and that the legislature of New Hampshire was forbidden by the general constitution to impair, much more to annul, its obligations. Unexpectedly, on this proposition Mr. Webster won his case. In handing down the decision of the court, Mr. Chief Justice Marshall held that the college was a private corporation, for a useful purpose; that the trustees, donors and the crown were original parties to a contract, the terms of which were the charter; that the state of New Hampshire was the successor to all the responsibilities and rights of the crown; that valuable consideration had been given on the faith of the charter; that the charter was a contract within the meaning of the constitution, and the legislature could not rescind it or change it, so long as its terms were complied with.

That this court-made law imported into the constitution a sense never contemplated by its framers will not be denied by historical students, and it profoundly modified American jurisprudence, withdrawing from sovereign states control over their own corporate creations, where any vested interests have grown up in them. This decision, too, is largely responsible for the extreme conservatism regarding property, characteristic of the United States. The principle is not known to other lands. Means have been found to meet the situation created by the Dartmouth decision. It is now well-settled law that corporations have no inferential rights, but only those expressly named in the charter; that collateral agreements with the state will not be implied; that charters may be forfeited for their violation, or for the assumption of powers not

granted in them; that the right of the state to exercise police control or to preserve the community from injury cannot be alienated; that licenses do not constitute contracts inviolable by the state. Further protection is secured by making charters terminable at a given time, or by reserving in them a right to modify or repeal them.

It is also unquestioned law that the state may pass laws to regulate the exercise of contract rights, if the regulations are reasonable and for the preservation of the community, as that a railroad must not cross the highway at grade, or pass through cities at a high speed. On the other hand, while a statute is not a contract, contracts may grow up under them, as in a case where a conveyance of land is called for in the law, or taxes are remitted for a term to promote manufactures or secure a public good. The ramifications of the doctrine of "obligation of contracts" are many, affecting marriage, divorce, bankruptcy laws, procedure in enforcing contracts, etc. Under it has grown up much litigation, notwithstanding which there are obscure cases constantly arising for adjudication. See also *CONTRACTS*, Vol. VI, pp. 322-324; and *OBLIGATION*, Vol. XVII, pp. 704, 705.

O'BRIEN, CORNELIUS, a Roman Catholic archbishop; born in New Glasgow, Prince Edward Island, May 4, 1843; studied in Rome, at the College of the Propaganda. He was ordained in 1871, and became a professor in St. Dunstan's College, and held pastorates until 1882. On Jan. 21, 1883, he was consecrated archbishop of Halifax, Nova Scotia. He published *Philosophy of the Bible Vindicated* (1876); *After Weary Years*, a novel (1885); *Early Stages of Christianity in England* (1880); and other works.

O'BRIEN, JOHN, an American actor, better known by his stage-name of "John T. Raymond," was born in Buffalo, New York, April 5, 1836. He made his *début* at the Rochester Theater in 1853, in *The Honeymoon*. His first tour was made with E. A. Sothern in *Our American Cousin*, he taking the part of Asa Trenchard. After playing in various other comedies, Raymond, in 1871, went to New York, where he scored the success of his life, in *The Gilded Age*. This play he made peculiarly his own, and delighted thousands with his whimsically humorous rendition of Colonel Sellers. He made a European tour in the character, but did not meet with success, and soon returned to America. He made his last appearance on the stage in Hopkinsville, Kentucky. He died in Evansville, Indiana, April 10, 1887.

OBSERVANTS, an order of friars and nuns. See *FRANCISCANS*, Vol. IX, pp. 698-700.

OBSERVATORY. To the very complete description of modern observatories given in the ninth edition of the *ENCYCLOPÆDIA BRITANNICA*, Vol. XVII, pp. 708-717, there is not much to be added. In the United States, the most important additions have been the Lick Observatory, on Mount Hamilton, California; the Observatory of Yale University, at New Haven; and the Yerkes

Observatory, at Lake Geneva, Wisconsin, erected for the use of the University of Chicago. The latter is remarkable in possessing what now is, and long may be, the greatest refracting telescope in the world. (See TELESCOPE, in these Supplements.)

The Lick Observatory, on Mount Hamilton, was completed in 1888, and under the energetic administration of Professor Holden assumed a position among the leading institutions of its kind. Its refracting telescope was the greatest in the world until the completion of the Yerkes instrument. It has been made famous by the observations of Barnard, Schaeberle, Campbell, Keeler, Tucker and others. The work of these astronomers has covered all the fields that could be cultivated with the instruments at their disposal. Here Keeler brought the art of determining by the spectroscope the motion of stars in the line of sight to a degree of perfection never reached before, and reached since only by the Astrophysical Observatory, at Potsdam.

The Yale Observatory has been devoted principally to work of the highest order in astronomical measurement, by Dr. W. L. Elkin. The most noteworthy instrument which it possesses is its heliometer, a masterpiece from the workshop of the Repsolds, and the only instrument of its kind in use in the United States. With this instrument Dr. Elkin took a prominent part in the campaign for determining the solar parallax in 1889; made a new triangulation of the Pleiades, and is now completing an investigation of the motions of the satellites of Jupiter and of the mass of that planet.

The Leander McCormick Observatory of the University of Virginia has, as its principal instrument, a 26-inch refractor, the twin brother of the Washington telescope. With this instrument Professor Stone recently made measurements of the satellites of Saturn, with the view of determining their orbits and motions.

The new Naval Observatory at Washington was completed and occupied in 1892. Since that time the work of Professor Hall with the great telescope has been continued by Professor Brown; Assistant Astronomer Skinner has observed a zone of stars for the International Astronomical Society with the transit circle, and Assistant Astronomer Hill has made observations for the variation of latitude.

At Philadelphia a small but not unimportant observatory has been erected by the University of Pennsylvania. The astronomer, Professor Doolittle, is getting it into active operation, and has decided to continue his investigations on the variation of latitude and the motion of the earth's axis.

At Albany, a new building has been erected for the Dudley Observatory, which has been supplied with an excellent telescope by Brashear. Professor Boss, in 1896, was actively engaged in getting his meridian circle at work in making new standard determinations of the positions and proper motions of certain stars. SIMON NEWCOMB

OBSTRUCTION AND OBSTRUCTIONISTS. See HOME RULE, in these Supplements.

OCALA, a city and the capital of Marion County, central eastern Florida, 35 miles S.S.E. of Gainesville, and midway between Jacksonville and Tampa, on the Florida Central, the Savannah and the Florida Southern railroads; is in the vicinity of orange groves, market gardens, cotton, sugar-cane and sweet-potato farms, and phosphate beds in working. Population 1890, 2,904.

OCAÑA, a town of the department of Santander, in Colombia, 220 miles S.E. of Cartagena; is a center of trade between Lake Maracaibo and the Magdalena region; picturesquely situated at an elevation of 3,800 feet, and in a fertile country. It was founded in sixteenth century.

OCARINA, a recent Italian instrument of flute-like sound, made of pottery, pierced with small holes and shaped like the body of a bird, without head or neck. A series of seven ocarinas are used to produce operatic melodies. The tone is soft and sweet.

OCCOM, SAMSON, an American Indian preacher; born near New London, Connecticut, about 1723. He accepted the doctrines of Christianity about 1740. Rev. Eleazar Wheelock educated him at his school at Lebanon, Connecticut. In 1748, Occom taught school at New London; that same year he went to Montauk, Long Island, where he was a missionary among his own tribe for ten years; he was ordained a minister of the Presbyterian Church. By a trip to Great Britain he obtained over \$50,000 for use in the endowment of an Indian school which grew into Dartmouth College. Occom preached afterward to the Indians on Long Island; but in 1786 he removed to the Brotherton tract, in Oneida County, New York. Later on he resided among the Stockbridge Indians. He was the author of several hymns; among them, *Awaked by Sinai's Awful Sound*. He wrote, also, an account of the manners of the Montauk Indians. He died at New Stockbridge, New York, July 14, 1792.

OCCULTATION. See *Eclipses of the Sun and Moon*, under ASTRONOMY, Vol. II, pp. 802, 803.

OCCUPANCY, a legal term denoting one method of obtaining title to real and personal property,—a notion derived from Roman law, and supposed to originate in laws of nature, especially in those things which are open to, and therefore presumably the property of, all. Such titles to land can only arise in special cases; one of which is the accretion of land from the ocean shore, a navigable stream or a lake; another, where a defect in law provides no legal owner for a given time.

OCCUPATION, MILITARY, is the act of taking and holding possession of a city, town or other territory belonging to an enemy, by military forces. The place is generally put under martial law during the continuance of such occupation. The occupation extends to such adjoining territory as the military forces may be able to hold under actual control. The military law established over territory thus occupied suspends the local law,

but in practice only so much of it as may conflict with peaceful possession. It continues so long as the conquering power may occupy the territory or until the cessation of hostilities. The citizens of a territory occupied by a hostile power will incur no liability from recognizing the authority of the power in control, because when a government is unable to protect its citizens its claim to their allegiance is suspended.

OCEAN CURRENTS, in the Atlantic. See ATLANTIC, Vol. III, pp. 18–20. In the Pacific. See PACIFIC OCEAN, Vol. XVIII, pp. 117, 118; see also INDIAN OCEAN and NORTH SEA.

OCEAN DEPTHS. See DREDGE, Vol. VII, pp. 461–463; also PACIFIC OCEAN, Vol. XVIII, p. 121.

OCEAN GROVE, a town and watering-place in Monmouth County, eastern New Jersey, 54 miles S. of New York; separated from Asbury Park on the north by a narrow lake; on the Central New Jersey and the Pennsylvania railroads; a popular seaside resort; principally known as the seat of the Ocean Grove Camp-meeting Association of the Methodist Episcopal Church. The association was organized in 1869, and now has two places of assembly, one erected in 1880 at a cost of \$10,000, and another erected in 1894 at a cost of \$75,000. Population 1890, 2,754; 1895, 2,880.

OCEANICA. See POLYNESIA, Vol. XIX, pp. 418–428.

OCEAN LIFE. See DISTRIBUTION, Vol. VII, pp. 276–281.

OCHER, a native ferruginous clay, which is used as a pigment. See PIGMENTS, Vol. XIX, p. 87.

OCMULGEE, a river, a branch of the ALTA-MAHA. See GEORGIA, Vol. X, p. 434.

O'CONNOR, THOMAS POWER, an Irish statesman; born at Athlone, County Roscommon, Ire-



T. P. O'CONNOR.

Beaconsfield: A Biography. Mr. O'Connor was elected member for the town of Galway at the general election of 1880, and soon became one of the most active and prominent members of the party led by Mr. Parnell. He was one of the executives of the Land League, both in England and Ireland. In October, 1881, he came to the United States and lectured on the Irish cause to large gatherings in nearly all the great cities, during a tour which extended over seven months, and raised a large sum of money. In 1883 he

was elected president of the "Irish National League of Great Britain." He edited a *Cabinet of Irish Literature*, and wrote a large number of tales, essays and magazine articles. In 1885 he published his principal work, *The Parnell Movement*. He is now a Member of Parliament from a Liverpool district, and is editor of the London *Sun* and *Sunday Sun*.

OCONOMOWOC, a city of Waukesha County, southeastern Wisconsin, and a noted summer resort, about 30 miles W. of Milwaukee and 15 miles N.W. of Waukesha. It is the seat of a young ladies' seminary, and has a thriving local trade. It is beautifully situated on Oconomowoc Creek, and is surrounded by many charming lakes. Population 1890, 2,660; 1895, 3,178.

O'CONOR OR O'CONNOR, CHARLES, an American lawyer; born in New York City, Jan. 22, 1804. Commencing

the practice of law at an early age, his life was devoted to the pursuit of his profession, in which he became eminent. His most famous case was the Forrest divorce case, which placed him among the great pleaders of the United States. Throughout the Civil War he sympathized with the Southern states, and he became counsel for Jefferson Davis when he was indicted for treason. He was chief counsel in the proceedings of 1871–75 against the notorious "Tweed ring" in New York City, and published an account of the cases under the title, *Peculation Triumphant: The Record of a Five-Years' Campaign Against Official Malversation* (1875). In 1872 he was nominated for the Presidency by the old-line Democrats who were unwilling to vote for Horace Greeley, the regular party nominee, but he did not receive an electoral vote. He became president of the Law Institute of New York in 1869. He died in Nantucket, Massachusetts, May 12, 1884.



CHARLES O'CONOR.

OCONTO, a city and the capital of Oconto County, eastern Wisconsin, on Green Bay, at the mouth of the Oconto River, and on the Chicago, St. Paul and North-Western railroads, 149 miles N. of Milwaukee. It has large steam saw-mills and exports pine lumber; has iron foundries, wagon factories and planing-mills. Population 1890, 5,219; 1895, 6,017.

OCTANE, one of the normal paraffins. See CHEMISTRY, Vol. V, p. 557.

OCTAVE THANET. See FRENCH, ALICE, in these Supplements.

OCTOCORALLA. See ACTINOZOA, Vol. I, pp. 130, 131.

OCTOPODA, suborder of *Dibranchiata*. See MOLLUSCA, Vol. XVI, p. 670.

OCTOPUS, a genus of cephalapodous mollusks, typical of the suborder of eight-armed cuttle-fishes (*Octopoda*). The various members

of the suborder *Octopoda* are popularly known as devil-fishes. They are widely distributed, and are common near the shores of warm seas. The structural features are fully discussed in the article MOLLUSCA, Vol. XVI, p. 670.

ODD FELLOWS, INDEPENDENT ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

ODENWALD. See FORESTS, Vol. IX, p. 400.

ODIC OR ODYLIC FORCE. See MAGNETISM, ANIMAL, Vol. XV, pp. 277, 278.

ODIN. See ASGARD, Vol. II, pp. 679, 680.

ODIN, a village of Marion County, south central Illinois, 64 miles E. of St. Louis, on the Illinois Central and the Baltimore and Ohio railroads; has an academy, a broom factory, a woolen-mill and a flour-mill. Population 1890, 817.

ODLING, WILLIAM, was born Sept. 5, 1829, in Southwark, England; was educated at private schools, and, for the medical profession, at Guy's Hospital. He was graduated at the University of London in 1851, and was appointed demonstrator of chemistry at Guy's Hospital in 1850; lecturer on chemistry at St. Bartholomew's Hospital in 1863; Fullerian professor of chemistry at the Royal Institution in 1868; Waynflete professor of chemistry in the University of Oxford, June 17, 1872; and elected a fellow of Worcester College on the following day. Dr. Odling published a *Manual of Chemistry* (1861); *Lectures on Animal Chemistry* (1866); *Course of Practical Chemistry* (1876); and various scientific memoirs, especially on chemical theory.

ODOBÆNUS, same as TRICHECHUS. See MAMMALIA, Vol. XV, p. 443.

ODOMETER OR HODOMETER, an instrument employed for registering the number of revolutions of a carriage-wheel and thereby recording the distance traveled. The instrument consists of a number of cog-wheels attached to the axle of the wheel and registering the revolutions on a dial. Similar mechanisms are employed in the pedometer and cyclometer.

ODONATA, suborder of *Orthoptera*. See INSECTS, Vol. XIII, p. 152.

O'DONOVAN, DENIS, a British writer, was born in Kinsale, County Cork, Ireland, in 1836, and was educated in Ireland and France. He arrived in Queensland in 1874, and was appointed Parliamentary librarian. Mr. O'Donovan had previously filled the position of professor of modern languages in the Collège des Hautes Études, afterward in the Catholic University of Paris, and lecturer in one of the colleges of the University of France. He was one of the editors of the *Ami de la Religion*, and the author of *Memories of Rome*, and some minor works. His latest work is his *Analytical Catalogue of the Queensland Parliamentary Library*. He also published a number of lectures on art and architecture.

O'DONOVAN, WILLIAM RUDOLF, an American sculptor; born in Preston County, Virginia, March 28, 1844. He served in the Confederate army during the Civil War. After the war he went to New York City and engaged in his profession, being chosen associate of the National

Academy. Among his portrait busts are those of William H. Beard and William Page. In full and heroic figures his work is well shown in the *Washington* monument at Newburg, New York, and the Tarrytown statue of the *Captors of Major André*.

ODONTOPTERIS, a genus of fossil ferns occurring in the carboniferous rocks of various parts of Europe and many localities in the United States. Both *Odontopteris* and the closely allied *Neuropteris* had fronds of great size.

ODONTORNITHES, a group of extinct birds, whose remains are found in the cretaceous strata on the plains east of the Rocky Mountains. There are two groups of these birds, with few common characters except teeth. The *Odontorhina* were small birds, with bi-concave vertebræ and teeth set in sockets. The *Ichthyornis* and *Apatornis* were representatives. The birds of the second group, *Odontoholca*, were sometimes six feet long, with a very large tail. The wings were rudimentary and the vertebræ resembled those of existing birds. *Hesperornis* is the type of this group.

ODONTOSCOPE, an apparatus for viewing the human teeth, used by dental surgeons. It has a minute electric light and a circular dental mirror, and when inserted in the mouth enables the dentist to obtain a clear view of the teeth from all points.

CEDEMA. See DROPSY, Vol. VII, p. 472.

ENOTHERA, a large genus of plants of the family *Onagraceæ*. The numerous species are known as evening primroses and are all American, especially from western and southwestern United States. They are extensively cultivated for their showy flowers. They are chiefly herbs, either leafy-stemmed or acaulescent, with regular four-parted yellow, purple or white flowers, the calyx-tube prolonged beyond the ovary, and bearing at its throat the brightly colored petals and eight stamens. *E. biennis* is the common yellow-flowered species of the eastern United States. By many botanists this large genus is broken up into numerous genera.

CEREBRO, an ancient town of Sweden, at the entrance of the Svarta into the Hjelmars Lake, 170 miles W. of Stockholm. It has an ancient castle, in which many diets have been held; it is an important center for the iron trade, and has manufactories of woollens, knit goods, matches, etc. Population, 13,618.

OERSTED, HANS CHRISTIAN, a Danish physicist; born in Rudkjoebing, on the island of Langeland, Aug. 14, 1777. He was graduated from the University of Copenhagen in 1799. In 1806 he became professor of physics there. Electro-magnetism and cognate subjects were his particular studies, and he may be said to have been the originator of the electro-magnetism theory. He was the author of *The Soul in Nature*, translated by Miss Horner, and *Manual of Mechanical Physics* (see DENMARK, Vol. VII, pp. 91, 92.) He died in Copenhagen, March 9, 1851.—His brother, ANDERS

SANDOE, jurist; born in Rudkjoebing, Dec. 21, 1778; died May 1, 1860. He entered political life, and, after holding several minor offices, became Premier of Denmark in 1853, and remained in that office until the end of 1854. He is best known as a jurist and for his work upon the laws of Denmark. He published several volumes, among them *Danish and Norwegian Jurisprudence* (1822-33) and *A History of My Life and Times* (1851-57).—ANDERS SANDOE, naturalist, nephew of Hans Christian; born in Rudkjoebing, June 21, 1816; died in Copenhagen, Sept. 3, 1872. In 1837 he became professor of natural history in the University of Copenhagen. He published several volumes descriptive of his journeys and scientific discoveries in North and South America.

O'FERRALL, CHARLES TRIPLETT, governor of Virginia; born Oct. 21, 1840, near Brucetown, Frederick County, Virginia; entered the Confederate army as a private and attained to the rank of colonel; graduated in law at Washington and Lee University; elected county judge, served in the legislature, in Congress for several successive terms, and since 1894 has been governor of Virginia. In the Presidential campaign of 1896, he supported the "sound-money" candidates, despite the opposition of the Virginia press.

OGDEN, a city of Utah. This city is the location of machine and repair shops of the Central Pacific, and of iron-works, shops for producing mining-machinery and farm-implements, planing, woolen, saw and flour mills, furniture, confectionery, sash, baking-powder, cornice, brick and cigar factories, fruit canning, electric-light and broom factories, together with two breweries. It is the seat of Utah University, the construction of which, at a cost of \$500,000, was begun in 1890. The institution is of the Methodist Episcopal denomination. There are here Ogden Academy (Congregational), a military academy, 12 public schools, 1 state and 3 national banks, and 1 loan and trust company. Ogden has a Mormon Tabernacle, an opera-house, and six hotels, one of which was erected at a cost of \$150,000. On account of its evenness of climate the city is a favorite health-resort, the waters of the famous hot springs being especially efficacious in certain forms of scrofula, rheumatism and other diseases. Population 1890, 14,119; 1895, 15,828. See OGDEN, Vol. XVII, p. 732.

OGDEN, AARON, an American soldier; born in Elizabethtown, New Jersey, Dec. 3, 1756. He was graduated at Princeton in 1773. He took part in several daring adventures in the preliminary skirmishes between the British and Americans, and in 1776 was made captain in a New Jersey regiment, and was present at the battles of Brandywine and Monmouth. In 1779 he served as aide in an expedition of General John Sullivan against the Indians, and a year later fought at the battle of Springfield, New Jersey, where his horse was shot under him. Later he was commissioned by General Washington to visit Sir Henry Clinton for the purpose of proposing an exchange of Major André for General Benedict

Arnold. As might have been foreseen, Sir Henry Clinton's honor would not permit the exchange. In 1781 Ogden was present at the Yorktown surrender, eliciting high praise from Washington for his gallant conduct during the siege. After the war he studied law and practiced with success, and in 1796 was a Presidential elector. He was subsequently appointed lieutenant-colonel of the United States army, and for six months served as deputy quartermaster-general. On Feb. 28, 1801, he became United States Senator, and on Oct. 29, 1812, was elected governor of New Jersey. He died in Jersey City, New Jersey, April 19, 1839.

OGDEN, WILLIAM BUTLER, a Chicago pioneer; born in Walton, New York, June 15, 1805. He removed to Chicago in 1835; engaged in the real estate business; and in 1837 became the first mayor of the new city. Mr. Ogden was one of the founders of the Chicago and Galena railroad, the first railroad built in the Northwest, and was afterward president of the Chicago and North-Western, which grew out of the first-named. He was the first president of the Union Pacific railroad, and was one of the foremost lumbermen of the United States. During his life and by his will Mr. Ogden made many benefactions to institutions of learning and charity in Chicago and elsewhere. He died in New York City, Aug. 3, 1877.

OGDENSBURG, a port of entry in St. Lawrence County, New York. It is the headquarters of the Northern Transportation Company, a line of steamers plying between Chicago and intermediate points on the lakes, and annually carrying a large amount of grain and lumber, besides general lake and river freight. The city has also several fine public parks. The St. Lawrence River at this point is over two miles wide. Population 1890, 11,662. See OGDENSBURG, Vol. XVII, p. 733.

OGLESBY RICHARD JAMES, an American statesman; born in Oldham County, Kentucky, July 25, 1824. Being thrown upon his own resources by the death of his parents, in 1832 he went to Decatur, Illinois, and apprenticed himself to a carpenter. Later he was engaged in farming and rope-making, yet found time to study law, and in 1845 was admitted to the bar of Illinois. He served as a first lieutenant in the Mexican War, and, after the discovery of gold in California, made the over-



RICHARD J. OGLESBY.

land trip thither, and from 1849 until 1851 was engaged in mining. He returned in 1851, and resumed his law practice. He was elected state senator in 1860, but did not serve, on account of the breaking out of the Civil War, in which he took an active part, entering the struggle as colonel of the Eighth Illinois Regiment, and attaining the rank of major-general of volunteers.

He was elected governor of Illinois in 1864; re-elected in 1872; chosen United States Senator in 1873 for a term of six years. From 1885 to 1889 he was again governor of Illinois.

O'HARA, THEODORE, an American poet and soldier; born in Danville, Kentucky, Feb. 11, 1820; was admitted to the bar in 1845, and took part in the Mexican War. He was for a time after the close of the war editor of papers in Louisville and Frankfort, Kentucky, and Mobile, Alabama. In the Civil War he served in the Confederate army. He is known, however, for his poems, especially for the *Bivouac of the Dead* and *The Old Pioneer*. He died in Bullock County, near Guerryton, Alabama, June 6, 1867.

OHIO had a population in 1890 of 3,672,316, a gain since 1880 of 14.83 per cent. From 1840 to



STATE SEAL OF OHIO.

the taking of the census of 1890 Ohio had occupied the third place in rank of population, but the eleventh census placed it fourth, and after Illinois. The number of inhabitants was 90.10 to the square mile, a greater density than that of any other of the states of the north central division, the average of which was only 20.68. The cities of Ohio having a population of 8,000 or more numbered 29, in which resided 1,159,342 inhabitants, making the urban population 31.57 per cent of the state. The male inhabitants numbered 1,855,736, the female 1,816,580, a more equal division of the sexes than in any other state of the group to which Ohio belongs. The percentage of native-born citizens was 87.49, of foreign-born 12.51. The number of negroes was 87,113, a decrease since 1880 of 133. The population also included 183 Chinese, 22 Japanese and 193 civilized Indians.

Ohio has been near the center of population of the United States since 1830. In that year the center was in the neighboring state of West Virginia; in 1860 it was in the southern part of Ohio, twenty miles from Chillicothe, the first capital. In 1870 it had shifted to a point 48 miles N.E. of Cincinnati; in 1880 it was eight miles S.W. of that city; in 1890 it had moved slightly to the northwest, still within forty miles of Cincinnati.

The gross area of Ohio is 41,060 square miles, of which 300 is water surface, leaving 40,760 square miles, or 26,086,400 acres of land surface.

Almost ninety per cent of this land surface is under cultivation in Ohio, and all branches of agriculture receive attention. Fruit-raising is a large industry, and the state is famed for its apples, peaches, plums and grapes.

The production of the cereals in Ohio in 1889 is shown in the accompanying table, the percentages being that of the entire crop of the United States:

PRODUCT.	ACRES.	PER CENT.	RANK	BUSHEL.	PER CENT.	RANK
All cereals---	6,785,280	4.84	7th	191,818,162	5.45	6th
Corn -----	3,189,553	4.42	7th	113,892,318	5.37	6th
Wheat -----	2,269,585	6.76	5th	35,559,208	7.59	5th
Oats -----	1,215,355	4.29	10th	40,136,732	4.96	7th
Barley -----	37,092	1.15	13th	1,059,915	1.35	11th
Rye -----	59,643	2.75	12th	1,007,156	3.54	10th
Buckwheat---	14,052	1.68	9th	162,833	1.34	9th

The increase in the acreage of oats since 1879 was 304,967, and the average yield recorded for 1889 was 33+ bushels per acre. The yield of barley for the year mentioned was 28+ bushels to the acre, which was greater than the average either for the United States or for the north central group. In rye, the acreage of 1889 was more than double that of 1879, the average yield more than sixteen bushels per acre, while the average yield for the United States was 13.09 bushels per acre. The first statistics of the flax crop were gathered in 1849, at which time Ohio was one of three states producing 57.38 per cent of the entire seed product, and individually producing more than two and one half times as much as any other state. Between 1879 and 1889 Ohio fell off 85.10 per cent in the production of fiber and 75.46 per cent in the production of seed. In rank, Ohio, which had produced more flax during fifty years than any other state, occupied the eighth place, following close behind the states of the far West. In the production of hemp, in 1889 Ohio stood fifth in acreage, sixth in amount produced, eighth in average yield per acre, sixth in total value of product and second in average value per ton. In tobacco, Ohio increased the acreage planted in 1889 over the area in 1879 by 9,627 acres. The rank among the states was fifth, the number of acres 44,303; the percentage of total area 6.37; the rank in production was third; the production in pounds was 37,853,563 and the percentage of the entire product of the United States was 7.75.

The following additional agricultural items are also from the census report of 1890:

Pounds of maple sugar produced-----	1,575,562a
Gallons of maple molasses made-----	727,142b
Gallons of sorghum molasses made-----	547,630
Acres of meadow-land mown for hay-----	2,992,026
Tons of hay produced-----	3,981,070
Bushels of clover-seed produced-----	636,430
Bushels of other grass-seed produced-----	121,316
Acres of Irish potatoes-----	185,393
Bushels of Irish potatoes produced-----	15,804,931
Acres of sweet potatoes-----	1,430
Bushels of sweet potatoes produced-----	148,408
Acres of broom-corn-----	1,574
Pounds of broom-corn produced-----	801,957

The number of farms in Ohio in 1890 was greater than that of any other state of the Union, the aggregate being 251,430.

(a) Almost one half the entire product of the north central states.

(b) Considerably more than one half the product of the north central states.

TABLE SHOWING THE RELATIVE SIZE OF THE FARMS.

Under 10 acres-----	12,325
10 acres and under 20 acres-----	14,658
20 acres and under 50 acres-----	51,846
50 acres and under 100 acres-----	82,380
100 acres and under 500 acres-----	89,036
500 acres and under 1,000 acres-----	1,022
1,000 acres and over-----	163
Average size of farms, acres-----	93

Of these, 193,385, or 77.12 per cent, were cultivated by the owners; 18,947, or 7.53 per cent, were rented for money; 38,588, or 15.35 per cent, were rented on shares.

The aggregate acreage of the farms of the state by the census of 1890 was 23,352,408, of which area almost eighty per cent was improved. The total value of the lands, fences, buildings, farm implements and machinery and live-stock was given as \$1,195,688,864; the estimated value of the farm products of 1889 was \$133,232,498; the number of horses was 880,667; mules and asses, 18,858; neat cattle, 1,763,387; swine, 3,275,922; and sheep, 4,060,729, whose wool clipped the season previous amounted to 20,987,574 pounds. In sheep, Ohio stood second only to Texas, although a decrease had taken place, since the former census, of 841,757 head. Ohio reported the largest number of sheep to the square mile of land surface of any state. The weight of fleeces had been increased from 5.10 pounds to 5.70 pounds per sheep, the majority of which were merinos or grade merinos. In 1889 more than 250,000 head of swine died of disease in Ohio; the total number of swine in the state was 100,000 in excess of that of 1879. The number of neat cattle on farms was between forty and fifty to the square mile. Ohio had the highest percentage of pure-bred cattle of any of the north central states, and was second in the annual production of milk per cow, the average in Ohio being 411.31 gallons. In 1889 Ohio and Iowa were the only states reporting over one million pounds of cheese made on farms.

The report of the Ohio State Board of Agriculture for 1895 gives the following statistics relative to the crops of the preceding year:

	ACRES.	BUSHELS.
Wheat -----	2,516,566	50,852,433
Corn -----	2,828,517	70,712,925
Oats -----	981,456	31,786,300
Barley -----	15,219	455,687
Rye -----	40,914	775,406

In the production of minerals Ohio stood fifth among the states, the total value of the output of 1889 amounting to \$26,653,439. In the item of iron ore, 70 mines were reported as producing 254,294 long tons, of the value of \$532,725. Coal-mines to the number of 2,068 reported an output of 9,976,787 tons, of the value of \$9,355,400. The number of employees was 19,591, the wages paid amounted to \$6,892,604, all expenditures reached the sum of \$8,232,183, and the capital invested was given as \$14,018,236. The output of crude petroleum amounted to 12,471,-

466 barrels, of the total value of \$2,173,995. Illuminating oil to the amount of 317,037 barrels was refined, the value being \$340,683. Lubricating oil to the amount of 1,240 barrels returned \$10,334, and fuel oil yielded 12,153,189 gallons of the value of \$1,822,978. The number of petroleum wells was 2,640, of which 785 were flowing wells and 1,855 required pumping. The



CAPITOL BUILDING, COLUMBUS.

aggregate capital invested in the oil business within the state reached the sum of \$17,771,152; the number of employees was 2,123 and the wages paid amounted to \$836,377. The value of the natural gas produced during the year was given as \$1,120,997; the capital invested, \$12,953,750; the number of employees, 983; the wages paid, \$241,218, and the expenses for material, \$5,722,865.

In the production of useful stone, Ohio ranks second, the number of quarries being 413 and the value of the product \$4,361,590; limestone, valued at \$1,514,934; sandstone, at \$3,046,656. Other mineral products are grindstones, gypsum, metallic paint and mineral waters. The reported value of the salt produced in 1889 was \$212,541.

The fisheries of the state in 1889 had 2,012 persons engaged, the capital invested was \$1,328,428, and the value of the product was \$746,396.

The census reports of 1890 give the number of specified manufacturing industries as 28,673, in which \$402,793,019 were invested; 331,548 employees engaged, \$158,768,883 paid in wages; and finished products valued at \$641,688,064 were turned out. The principal industry was that of iron and steel, which yielded a return of \$57,134,110. Fourteen other industries yielded products valued at from \$43,617,072 for foundry and machine-shop products, down to men's clothing, which amounted to \$10,641,375. Among other industries named as producing more than \$10,000,000 were flouring and grist mills, factories, carriages and wagons, malt liquors, refined petroleum, lumber and other wood-working mills, agricultural implements, and slaughtering and meat-packing.

The commissioner of common schools of Ohio makes the following report for the year 1895:

Number of districts-----	11,230
Number of teachers employed-----	25,004
Number of women teachers-----	14,738
Number of men teachers-----	10,266
Number of children, 6 to 21 years-----	1,159,258
Number of pupils enrolled in schools-----	817,490

Daily attendance	593,465
Number of schoolhouses	13,039
Value of schoolhouses and grounds	\$38,925,896
Available for expenditure	\$18,887,597
Amount expended	\$13,805,105
Amount paid teachers	\$ 7,907,860
Number of teachers' institutes held	88
Continuing in days	567
Attendance at institutes	20,013
Expended for institutes	\$ 26,486

TABLE OF THE DENOMINATIONAL INSTITUTIONS OF OHIO FOR HIGHER EDUCATION.

LOCATION.	INSTITUTION.	RELIGIOUS DENOMINATION.
Akron	Buchtel College	Universalist.
Alliance	Mount Union Coll.	Methodist Epis.
Berea	Baldwin Univ.	Methodist Epis.
Berea	Ger. Wallace Coll.	Methodist Epis.
Cincinnati	Bartholomew Sch.*	Protestant Epis.
Cincinnati	St. Joseph's College.	Roman Catholic.
Cincinnati	St. Xavier's College.	Roman Catholic.
Cleveland	Calvin College	Reformed.
Cleveland	St. Ignatius College.	Roman Catholic.
Columbus	Capital University	Lutheran.
Delaware	Ohio Wesleyan Univ.	Methodist Epis.
Findlay	Findlay College	Church of God.
Gambier	Kenyon College	Protestant Epis.
Glendale	Female College	
Granville	Denison Univ.	Baptist.
Granville	Female College*	Presbyterian.
Granville	Shepardson Coll.	Baptist.
Hillsboro	Hillsboro College	Methodist Epis.
Hiram	Hiram College	Christian.
Lima	Lima College	Lutheran.
New Concord	Muskingum College.	United Pres.
Oxford	Oxford College	Presbyterian.
Rio Grande	Rio Grande College.	Free Baptist.
Scio	Scio College	Methodist Epis.
Springfield	Wittenberg College.	Lutheran.
Tiffin	Heidelberg Univ.	Reformed.
Urbana	Urbana University	N. Church.
W. Farmington	Farmington College.	Methodist Epis.
Westerville	Otterbein Univ.	United Brethren.
Wilberforce	Wilberforce Univ.	African Meth. Epis.
Wilmington	Wilmington College.	Friends.
Wooster	Univ. of Wooster	Presbyterian.

TABLE OF NON-SECTARIAN INSTITUTIONS OF OHIO.

LOCATION.	INSTITUTION.
Athens	Ohio University.
Bainsville*	Lake Erie Seminary.
Cincinnati	University of Cincinnati.
Cleveland	Western Reserve University.
Columbus	Ohio State University.
Defiance	Defiance College.
Germanatown	Twin Valley College.
Hopedale	Hopedale Normal College.
Marietta	Marietta College.
New Athens	Franklin College.
Oberlin	Oberlin College.
Oxford	Miami University.
Richmond	Richmond College.
Yellow Springs	Antioch College.

In 1890 there were in Ohio 9,345 church organizations, 8,857 edifices, a membership of 1,215,409, which was 33.10 per cent of the population, and church property of the value of \$42,138,862. Forty-nine denominations and 5 independent organizations were enumerated; the leading ones are: Baptists (all bodies) 846, Roman Catholics 586, Christians 273, Christian Union

* Exclusively for girls.

103, Congregationalists 247, Disciples of Christ 475, Dunkards 153, Evangelical Association 216, Friends 131, German Evangelical Synod 107, all Lutherans 588, all Methodists 2,798, all Presbyterians 828, Protestant Episcopal 169, Reformed 299, and United Brethren 995.

On Jan. 1, 1896, there were 1,142 newspapers published in Ohio, one or more in all of the 88 counties, and in 380 cities, towns and villages of the state, of which 88 were county seats. Of the whole number of papers, 158 were dailies, 7 triweekly, 39 semiweekly, 792 weekly, 4 fortnightly, 14 semimonthly, 110 monthly, 2 bi-monthly, and 16 quarterly.

The report of the state treasurer shows that the total receipts from all sources for the fiscal year 1895 amounted to the sum of \$4,029,394, which included a balance of \$802,264 carried over from 1894. The expenditures of the year were \$3,795,721, leaving a balance at the close of 1895 of \$233,673. The total state debt, July 1, 1896, was \$1,291,665, all of which will be extinguished July 1, 1900. Within the period from 1892 to 1896 more than \$1,500,000 of the funded debt of the state was paid.

The value of all taxable real estate and personal property in Ohio, according to the consolidated tax duplicate of 1895, was as follows:

Real estate in cities and villages	\$ 625,179,132
Real estate not in cities and villages	589,748,953
Chattel property	527,589,429

Total

The taxes for 1896 were as follows:

For state purposes (2-7/8 mills)	\$ 4,790,054
For county purposes	9,986,407
Township, city, school and special taxes ..	25,747,573

Minor sources of revenue	\$40,524,035
	4,087,255

Total

TABLE OF STATE PUBLIC INSTITUTIONS, THEIR LOCATION, COST OF MAINTENANCE, AND AVERAGE NUMBER OF INMATES FOR 1895.

INSTITUTION.	LOCATION.	NO. INMATES.	MAINTENANCE.
Athens State Hospital (a)	Athens	828	\$134,504
Columbus State Hosp. (a)	Columbus	1,149	184,656
Dayton State Hosp. (a)	Dayton	792	136,385
Cleveland State Hosp. (a)	Cleveland	929	143,923
Massillon State Hosp. (a)	Massillon	---	64,446 ^b
Toledo State Hosp. (a)	Toledo	1,183	180,598
Ohio Hosp. for Epileptics	Gallipolis	351	142,288
Longview Asy. for Ins. (c)	Longview	750	128,398
Ohio Institution for Fee-ble-minded Youth	Columbus	952	148,651
Girls' Industrial Home	Delaware	340	41,204
Ohio Inst. for the Blind	Columbus	230	64,584
Ohio Working Home for the Blind	Iberia	60	8,831
Institution for the Deaf and Dumb	Columbus	456	97,843
Ohio State Reformatory	Mansfield	---	50,000 ^d
Ohio Soldiers' and Sailors' Home	Sandusky	1,257	171,419
Ohio Penitentiary	Columbus	2,020	387,733

(a) For the insane.

(b) In course of erection.

(c) Partially supported by city of Cincinnati.

(d) Not completed for occupancy.

The report of the commissioner of railroads and telegraphs, made in 1895, gives the following facts:

Railroad corporations in the state-----	84
Miles of track in the state-----	12,596
Miles not of standard gauge-----	200
Miles steel-rail track-----	11,123
Mileage and equipment investment-----	\$560,250,901
An average per mile of-----	\$65,739
Earnings in 1894 in Ohio-----	\$60,140,831
Decrease from 1893-----	\$22,982,910
Operating expenses for 1894, in Ohio-----	\$43,230,655
Decrease from 1893-----	\$10,291,881
Persons employed during the year-----	54,733
Amount of salaries-----	\$30,546,709
Passengers carried during the year-----	27,231,220
Tons of freight hauled-----	59,639,559
Telegraph companies doing business in Ohio-----	6
Miles of line in operation-----	53,353
Capital stock, aggregate-----	\$103,440,625

In 1895 the state of Ohio appropriated \$133,415 for the support and maintenance of the National Guard, which had a total strength of 6,039 officers and enlisted men. There were 102 companies of infantry, 8 batteries of artillery and 2 troops of cavalry. There were 8 full regiments of infantry, a battalion of 3 companies of negroes, an unattached company of infantry mounted on bicycles. During the preceding year there had been many calls on the Guard of the state, and the expenses attendant on these special calls approximated \$143,000. The Federal appropriation for the Guard was about \$20,000.

The following is a list of the principal cities and towns of Ohio, with the populations as given in the census reports of 1890: Cincinnati, 296,908; Cleveland, 261,353; Columbus, 88,150; Toledo, 81,434; Dayton, 61,220; Youngstown, 33,220; Springfield, 31,895; Akron, 27,601; Canton, 26,189; Zanesville, 21,009; Findlay, 18,553; Sandusky, 18,471; Hamilton, 17,565; Lima, 15,981; Newark, 14,270; Mansfield, 13,473; Steubenville, 13,394; Portsmouth, 12,394; Chillicothe, 11,288; East Liverpool, 10,956; Ironton, 10,939; Tiffin, 10,801; Massillon, 10,092. In addition to the above there were 47 cities and towns having a population less than 10,000 and in excess of 4,000.

List of the governors of Ohio, beginning with the first governor after admission of the state into the Union in 1802: Edward Tiffin, 1803-07; Thomas Kirker, 1807-08; Samuel Huntington, 1808-10; Return Jonathan Meigs, 1810-14; Othniel Looker, 1814; Thomas Worthington, 1814-16; Ethan Allen Brown, 1816-22; Allen Trimble, 1822; Jeremiah Morrow, 1822-26; Allen Trimble, 1826-30; Duncan McArthur, 1830-32; Robert Lucas, 1832-36; Joseph Vance, 1836-38; Wilson Shannon, 1838-40; Thomas Corwin, 1840-42; Wilson Shannon, 1842-44; Thomas W. Bartley, 1844; Mordecai Bartley, 1844-46; William Bebb, 1846-49; Seabury Ford, 1849-50; Reuben Wood, 1850-53; William Medill, 1853-56; Salmon P. Chase, 1856-60; William Dennison, 1860-62; David Tod, 1862-64; John Brough, 1864-65; Charles Anderson, 1865-66; Jacob Dolson Cox, 1866-68; Rutherford B. Hayes, 1868-72; Edward F. Noyes, 1872-74; William Allen, 1874-76; Ruth-

erford B. Hayes, 1876-78; Richard M. Bishop, 1878-80; Charles Foster, 1880-84; George Hoadley, 1884-86; Joseph B. Foraker, 1886-90; James E. Campbell, 1890-92; William McKinley, Jr., 1892-96; Asa S. Bushnell, 1896-. See also OHIO, Vol. XVII, pp. 734 738.

OHIO RIVER, the largest eastern tributary of the Mississippi, which river it joins at Cairo, about 1,200 miles from the Gulf of Mexico, after following a west-southwesterly course of 975 miles from Pittsburg, where it is formed by the junction of the Allegheny and the Monongahela. After leaving the state of Pennsylvania, through the western part of which it flows, it forms the boundary between Ohio, Indiana and Illinois on the right and West Virginia and Kentucky on the left. Its chief tributaries are the Muskingum, Scioto, Miami and Wabash on the north and the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland and Tennessee on the south. The area of the region drained by the Ohio has been variously estimated at from 202,000 to 214,000 square miles, and the volume of water discharged into the Mississippi, 158,000 cubic feet per second, is greater than that carried by the Missouri, which is but 120,000 cubic feet.

There are no rapids of importance in the river, except those at Louisville, which are avoided by means of a canal, and navigation is carried on from Pittsburg to the Mississippi on flat-bottomed steamboats during all of the year but a few weeks in the summer, when the water becomes so low that the river is fordable at many points above Cincinnati. The river shows great variations in level, the difference between low water and the high water during the freshets of the spring and early summer being fifty and sometimes sixty feet. Of the numerous islands in the course of the Ohio, some are fertile and others are mere sand-bars, known as "tow-heads." The river varies in width from 500 to 1,400 yards, and is spanned by bridges at Wheeling and Cincinnati.

The chief cities on its banks are Pittsburg, Wheeling, Portsmouth, Cincinnati, Covington, Newport, Louisville, Madison, New Albany, Evansville and Cairo.

OHIO STATE UNIVERSITY, an institution for the higher education of both sexes, maintained and controlled by the state of Ohio; located at Columbus. In 1862 Congress granted each state a certain acreage of land out of the public domain, the receipts from the sale of which were to be used in endowing a state institution of higher learning. Ohio accepted this grant, but did not organize a university until 1872, when the present institution was established and given a campus of about 340 acres in what is now the heart of Columbus. Liberal annual appropriations for its support have been made by the state legislature. Complete scientific laboratories have been equipped, and a library of about 15,000 volumes in 1895 has been collected. The agricultural and industrial instruction, in some states separated from the collegiate courses, is carried on in Ohio at the State University. In

addition to these and the collegiate courses, instruction is given in pharmacy, engineering, law, and veterinary medicine. In 1895 there were 85



OHIO STATE UNIVERSITY.

in the faculty and 900 students. Inclusive of the class of 1895, 537 had graduated. The endowment of the institution was valued at \$550,000, and the annual income in 1895 was about \$140,000.

OHIO UNIVERSITY, a co-educational, non-sectarian institution, located at Athens, Ohio. Provision was made in 1787 by the Ohio Company, in its purchase contract with the United States government, for an institution of learning, which was to be maintained by the legislature of the new state. In 1804 the Ohio University was established at Athens in compliance with the terms of this contract. Annual appropriations have been made to the institution by the state legislature, liberal at first but small of late. The first class was graduated in 1815. In 1895 441 had been graduated. There were 20 in the faculty and 286 students. The school possessed in 1895 a library of about 21,000 volumes. The productive funds in 1895 amounted to \$125,000, and the annual income was \$30,000. The institution is governed by a board of trustees, who are appointed by the governor of the state.

OHIO WESLEYAN UNIVERSITY, a co-educational institution, located at Delaware, Ohio. It is maintained and governed by the Methodist Episcopal Church, and was established in 1844. In addition to the regular collegiate courses, instruction is given in music, art and commercial studies. It has an endowment estimated, in 1895, at \$550,000, and that year its income was about \$84,000. In 1895 there were 53 in the faculty, 1,125 students in attendance, 17,000 volumes in the library, and 2,292 had been graduated.

OHM'S LAW. See ELECTRICITY, Vol. VIII, pp. 41-43; and ELECTRICITY, § 110, in these Supplements.

OHNET, GEORGES, a French novelist; born in Paris, April 3, 1848. He entered the journalistic field immediately after the close of the war of 1870, and was on the staff of the *Constitutionnel* and *Le Pays*. He wrote a drama, *Regina Sarpi*, in conjunction with Denayrouze, and a second, of which he was the sole author, *Marthe*, in 1877.

He published *Battles of Life*, a collection of romances, and followed it with a number of novels and dramas. Among his later novels are *Le Doctor Rameau* (1889); and *Dette de Haine*; *Les Dames de Croix Mort* (1886); *Volonté* (1888); (1891); *Le Maître des Forges* ("The Ironmaster") and *La Grande Marnière* were two of his dramas, among many, that had exceptional successes.

OIL CITY, a city of Venango County, western Pennsylvania, 13 miles N.E. of Tionesta, and 8 miles E.N.E. of Franklin, on the Allegheny River and the Allegheny Valley railroad. It is the principal oil market in the Pennsylvania petroleum region; contains several large oil refineries, pipe-works, iron foundries, engine and boiler works, and railroad shops; has a city hospital, a public library, and an oil exchange. A point of interest is Clark's Summit, within two miles of the city. Population 1890, 10,932.

OIL RIVERS, a general name given to a number of branches of the Niger forming the delta of that river, although some of these branches are said to have independent sources. They extend from the eastern boundary of the British colony of Lagos, to the northern limits of the German Cameroons, making a network of waterways, and forming one of the most extensive swamp systems in Africa. The lower portions of these rivers are marshy, but higher up the land becomes firm and dry. A large part of the palm-oil shipped from West Africa comes from this region, the principal port being Akasa, at the main mouth of the Niger.

OIL-TESTERS. Numerous forms of testers have been devised for ascertaining the flashing-point of petroleum oils designed for illumination, etc. Various tests have been legalized or prescribed by different states and governments. The Abel tester was the first to come into general use. This apparatus has been improved and modified by various inventors, Braun of Berlin applying a magnetic-pendulum arrangement for applying the test-flame; Engler and Hass, a stirrer for the oil-cup; and several have made use of the electric spark to fire the vapor. The Pensky and Pensky-Martens testers are used to determine the flashing-point of lubricating oils. A description of the Gray tester, a recent form for the same purpose, will serve pretty nearly for other makes as used for heavy oils generally. A brass oil-cup, about two inches in diameter, and of the same depth, stands on a tripod. It has a tight-fitting lid, through which is a steel shaft, the latter bearing within the cup two stirrers, one for oil, the other for vapor. The shaft is rotated by means of bevel wheels and a hand crank. The lid has three holes, and in the sliding cover are two more holes, which may be brought into correspondence with the two in the lid. By drawing back the shaft the openings may be uncovered, and the test-flame applied. A gas-flame or a lamp commonly is used for heating the oil-cup to the desired temperature.

OIL WELLS. See PETROLEUM, Vol. XVIII, pp. 717, 718.

OJEDA, ALFONSO DE, a Spanish explorer; born

in 1465 in Cuenca; Ojeda was one of the numerous adventurers who took part in the Spanish exploring expeditions which followed Columbus's discovery of America. He was with Columbus on the second voyage, and while in the interior of Hispaniola discovered gold-mines. He gave Venezuela its name, in 1499, while on an independent voyage. He was consecutively in command of expeditions to Venezuela, the Gulf of Darien, and San Sebastian. He was regarded as one of the greatest adventurers of his time, and many Spaniards, afterward prominent in American history, served under his banner. Among them were Cortes, Pizarro and Americo Vespucci. He suffered hardships, was imprisoned, and died in great poverty in Santo Domingo, West Indies, in 1515.

OJIBWAS or CHIPPEWAS, branch of Algonquin family. See INDIANS, Vol. XII, pp. 827-832.

OKA, a Russian river. See VOLGA, Vol. XXIV, p. 279.

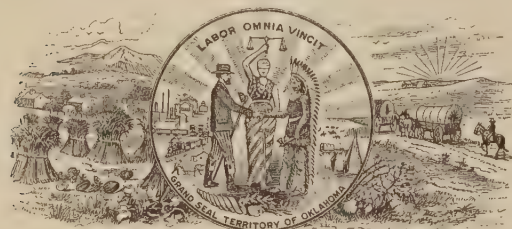
OKAYAMA, a town and prefecture in the province of Bizen, central Japan, 72 miles W. of Kobe; is connected by rail with Hiogo and the East, one of the most important mission stations in Japan. Population, 32,989.

OKECHOBEE LAKE, the largest lake in the southern part of the United States, situated in southern Florida; is partly included in Brevard and Dade Counties; is about forty miles long and 25 miles wide; its greatest depth is about twenty feet. The shores of the lake are for the most part swampy, and the lake itself almost inaccessible.

OKEFENOKEE SWAMP, an extensive swamp-tract of Florida and Georgia; covers an area of about five hundred thousand acres; is infested with alligators, rattlesnakes, and moccasins; has heavy forests of timber, and has an open lake, with many floating islands.

OKHOTSK, SEA OF. See SIBERIA, Vol. XXII, p. 6.

OKLAHOMA, one of the territories of the United States, organized May 2, 1890, is bounded



TERRITORIAL SEAL OF OKLAHOMA.

on the north by Kansas and Colorado, on the east by Indian Territory, on the south by Texas and Indian Territory, and on the west by Texas and New Mexico. The area is 39,030 square miles, of which 200 square miles is water surface and 38,830 square miles land surface. Oklahoma lies within the boundaries of the Louisiana Purchase of 1803, and was carved out of Indian Terri-

tory, to which was added "No Man's Land," a strip 170 miles long and 35 miles wide, lying between Texas on the south and Kansas and Colorado on the north, and so called because not included in any state or organized territory. This strip, with 5,439,865 acres in Indian Territory, purchased from the Creeks and Seminoles in 1889 for \$4,193,799, was thrown open to settlement by proclamation of the President, April 22, 1889. More than 50,000 persons entered on the first day, and the land was soon occupied. For almost a year the people were without an organized government, but early in 1890 the territory of Oklahoma was created. The section of country known as the Cherokee Strip was to be added to it when the title of the Indians should be extinguished. In 1891 almost 300,000 acres of land, formerly belonging to the Sac and Fox, Pottawatomie, Shawnee, Cheyenne and Arapahoe Indians, was thrown open to settlement; and in 1893 the Cherokee Strip of 6,000,000 acres was also opened. Some 90,000 people entered the Strip on the day named by the President, and much suffering ensued from lack of water and provisions.

The census reports of 1890 gave the population of the territory at 61,834, Wyoming, Arizona and Nevada, in the order named, standing below it. The number of males was 34,733; the number of females, 27,101; the percentage of native-born population was 95.57; the number of negroes, 2,973; of Chinese, 25; and of civilized Indians, 10.

In 1892 the population was reported by the governor at 133,100, the count having been made by a commission appointed by Congress. In 1893 the number of inhabitants was estimated at 151,213, and the residents of the Cherokee Strip numbered an additional 100,000. In 1894 the returns of the assessors showed a population of 212,635, and June 30, 1895, the total number of inhabitants was given by the Interior Department as 275,000.

The soil and products of Oklahoma Territory are very similar to those on similar meridians in Kansas and Texas, and the latter include almost every crop grown in the United States. The cereals thrive and grasses grow luxuriantly. Grapes and apples are well adapted to the uplands and fruits of all kinds are yielded abundantly.

The following statistics appear in the eleventh decennial census:

Number of farms	8,826
Acreage in farms	1,606,423
Improved land in farms, acres	563,728
Unimproved land in farms, acres	1,092,645
Valuation of land, fences, buildings, farm implements and machinery, and live-stock, \$12,221,020	
Horses	25,554
Mules and asses	4,923
Neat cattle	126,955
Swine	21,962
Sheep	16,565

With the increase in population came increased activity in all agricultural pursuits. In 1894 the following statistics were given out for the preceding year:

	ACRES.
Corn	284,254
Wheat	222,310
Oats	109,374
Cotton	21,311
Sorghum	18,755
Millet	14,121
Broom-corn	4,422
Potatoes	6,890

Total farm acreage 2,372,482

From 1890 to 1894 horses had increased 10,000; mules, 5,000; sheep, 20,000; swine, 33,000; and the number of milch cows was 27,145, and other cattle, 96,072.

In 1895 the value of the cotton crop alone was estimated at \$115,000.

In 1890 Oklahoma had 72 manufacturing industries, in which \$95,519 was invested, 195 hands employed, whose annual wages amounted to \$71,918, and which turned out finished products to the value of \$180,445. The leading industry was printing and publishing newspapers and periodicals, which returned \$72,905, followed by lumber to the value of \$27,260; boots and shoes, \$27,708; and saddlery and harness, \$13,848.

In 1895 there were four lines of railway in Oklahoma, operating 463 miles of road. The total valuation of the property, as assessed for taxation, was \$2,431,092.

The number of banks in the territory in 1895 was fifty-seven, with capital aggregating \$1,500,000, \$200,000 surplus and undivided profits, deposits of near \$3,000,000, loans and discounts almost \$2,000,000.

Coal, both anthracite and bituminous, petroleum, limestone, gypsum, sandstone, and fire and brick clay are found in many parts of the territory, and in 1895 gold was discovered in the Wichita Mountains.

The report of the territorial auditor gives the amount collected for the two years 1894-95 as \$192,727; disbursements within the same period, \$185,142. The taxable property, as equalized for assessment, was given in 1895 at \$39,275,189, an increase of almost one hundred per cent within the year preceding.

Educational reports for 1895 show the attendance at the public schools of the territory to have been 77,770. The total apportionment for the year amounted to \$54,665. Much interest is taken in the schools, and many fine structures have been erected; the new school building at Stillwater, completed in 1896, costing \$12,000. The University at Norman had an average attendance for 1895 of 160 students. Tuition is free, support coming from both the territory and the general government. The Normal School at Edmond had an attendance of 101 pupils, whose tuition was without cost, the institution being supported by territorial appropriations. At the same place a colored normal school is in course of erection. The Agricultural and Mechanical College at Stillwater opened in 1895, with 104 pupils at the first term. This institution enjoys a liberal Congressional endowment, and one third of the proceeds of the school fund arising

from the Cherokee Strip also comes into its treasury.

Up to 1895 the insane of the state were cared for at Jacksonville, Illinois. In the year named the territorial authorities contracted with an institution at Norman for the care of patients. Territorial convicts are committed to the prison at Lansing, Kansas, under contract with that state. The number of prisoners at the close of 1894 was 35.

From 1891 there has been an almost constant agitation throughout Oklahoma in regard to statehood, and several bills have been introduced into Congress looking to the admission of the territory into the Union. The plan most favored is to combine Indian Territory with Oklahoma when an arrangement can be effected with the Indian tribes on reservations there.

The territorial government consists of a governor, appointed by the President, a territorial treasurer, auditor, attorney-general, superintendent of public instruction, secretary of the board of school-land leases, inspector-general of militia, a chief and three associate justices. The territorial legislature comprises a council and house of representatives, elected biennially, and holding biennial sessions not exceeding sixty days in duration. The council consists of 13 members, the house of 26. In addition to the governor, the President appoints for the territory a district attorney and a marshal. Guthrie has been selected as the capital.

In 1890 there were in Oklahoma 123 church organizations, 41 edifices, a church membership of 4,901, which was 7.93 per cent of the entire population, and church property of the value of \$61,575. There were 9 Baptist organizations, 13 Roman Catholic, 10 Congregationalist, 51 Methodist (all bodies), 21 Presbyterian (all bodies), and 9 Disciples of Christ.

January 1, 1896, there were 129 newspapers published in the territory, of which 8 were daily, 1 semiweekly, 112 weekly, 1 semimonthly and 7 monthly. Papers were published in 57 of the cities, towns and villages, of which 21 were county seats.

The following are the principal cities and towns of Oklahoma, with the population for 1890: Oklahoma City, 4,151; Guthrie, 2,788; East Guthrie, 2,141; Kingfisher, 1,134; Norman, 787; Stillwater, 480; West Guthrie, 404; Frisco, 327; Edmond, 294; El Reno, 285; Reno, 234; Lexington, 223; and Magnum, 202.

The names of the governors are George W. Steele, 1890-92; Abraham J. Seay, 1892-93; Wm. C. Renfrow, 1893-97; Cassius M. Barnes, 1897-.

OKLAHOMA, UNIVERSITY OF, a non-sectarian institution of higher learning established by act of the Oklahoma territorial legislature at Norman (q.v., in these Supplements) in 1892. In 1895 there were 6 instructors and 210 students. It has a library of 2,000 volumes. The institution is supported by a territorial tax and by endowment from the United States government. Its total income in 1896 was \$16,300.

OKLAHOMA CITY, a city and the capital of Oklahoma County, central Oklahoma, on the North Fork of the Canadian River, and on the Atchison, Topeka and Santa Fé and the Choctaw, Oklahoma and Gulf railroads, thirty miles S. of Guthrie. It was founded upon the opening of Oklahoma Territory for settlement in April, 1889. Within one month, eight hundred houses had been built. In the intervening five years from the date of its origin, \$150,000 had been expended in paving, fire protection, sewerage and lighting. The city has a complete telephone system and free mail-delivery. It has several manufacturing establishments, a cold-storage plant and a large grain-elevator, and has a large trade in agricultural products and lumber. Population 1890, 4,138.

OKOLONA, a village of Chickasaw County, northeastern Mississippi, about seventy miles S. of Corinth, on the Mobile and Ohio railroad. It contains a number of prosperous educational institutions and business houses. Population 1890, 2,099.

OKRA. See GUMBO, Vol. XI, p. 276.

OLAF, SAINT. See NORWAY, Vol. XVII, pp. 586, 587.

OLAF, TRYGVASON. See NORWAY, Vol. XVII, p. 586.

OLATHE, a city and the capital of Johnson County, eastern Kansas, 20 miles S.W. of Kansas City, on the Atchison, Topeka and Santa Fé and the Kansas City, Fort Scott and Memphis railroads; is in a farming district, and has the Kansas Institution for the Deaf and Dumb, a commercial college, and two libraries; contains flour-mills, canning-factory, and a number of wood-working establishments. Population 1890, 3,290; 1895, 4,806.

OLD GERMAN LANGUAGE. See GERMANY, Vol. X, pp. 516-520.

OLDHAMIA, a fossil of undetermined affinities found in the Cambrian system in Ireland. Some authors consider it a polyzoon or a hydrozoon, while others think it may be a plant.

OLD MAN'S BEARD. See FRINGE TREE, in these Supplements.

OLD POINT COMFORT, a village of Elizabeth City County, Virginia, at the south end of Chesapeake Bay, adjacent to Fortress Monroe, at the mouth of James River, and about 14 miles N. of Norfolk; is a well-known watering-place, and has good bathing-grounds and a fine hotel.

OLD RED SANDSTONE. See GEOLOGY, Vol. X, pp. 340-345.

OLD TOWN, a village of Penobscot County, southern central Maine, near the west bank of the Penobscot River, on the Maine Central and the Bangor and Aroostook railroads, 12 miles N.E. of Bangor; has extensive water-power, and is chiefly supported by its lumber business. Population 1890, 5,312.

OLD-TWO-SEED-IN-THE-SPIRIT PRE-DESTINARIAN BAPTISTS. See BAPTISTS IN THE UNITED STATES, in these Supplements.

OLEACINIDÆ, a family of air-breathing

gasteropod mollusks. The term is equivalent to *Glandinidæ*. The most most important genus is *Glandina*, of which several species are common in the southern United States.

OLEAN, a city of Cattaraugus County, southwestern New York, 70 miles S. of Buffalo, on the Olean Creek, and on the Erie, the Western New York and Pennsylvania, and the Central New York and Western railroads. It has oil and manufacturing interests, and is in a dairying district. Population 1890, 7,358.

OLEASTER, a name applied, in general, to members of the family *Eleagnaceæ*, a species of *Shepherdia* and *Elæagnus*, the well-known buffalo-berries and silver-berries.

OLEFIANT GAS. See ETHYLENE, in these Supplements.

OLEIC ACID, one of the acids present in olive, almond and other oils, in which it exists as glyceryl oleate, the compound being known as olein or elain. At temperatures above 57° F. it exists as a colorless liquid fluid, of an oily consistence, devoid of smell and taste, and if it has not been exposed to air, exerts no action on vegetable colors. At 40° it solidifies into a firm, white, crystalline mass, and in this state it undergoes no change in the air; but when fluid, it readily absorbs oxygen—very slowly if pure—becomes yellow and rancid, and exhibits a strong acid action with litmus paper. Oleate of potash forms a soft soap, which is the chief ingredient in Naples soap; while oleate of soda is a hard soap, which enters largely into the composition of Marseilles soap. Of recent years, a large number of oleates have come into use in medicine, which depend for their activity on the remarkable ease with which they are absorbed by the skin. Such are the oleates of zinc, mercury, lead, tin, morphia, etc., which in this form produce more rapid results than when applied as ointments.

OLEFINES. See CHEMISTRY, Vol. V, pp. 558, 559.

OLEOMARGARINE. See OLEOMARGARINE, Vol. XVII, p. 760; and BUTTER, in these Supplements.

OLEOMETER, an areometer or balance for ascertaining the densities of fixed oils. It consists of a very delicate thermometer-tube, the bulb being large in proportion to the stem, so weighted and graduated as to adapt it to the densities of the leading fixed oils. On the scale is marked the principal oils of commerce, with their specific gravity opposite. The standard temperature of the oleometer is 59° F.

OLIBANUM. See FRANKINCENSE, Vol. IX, p. 709.

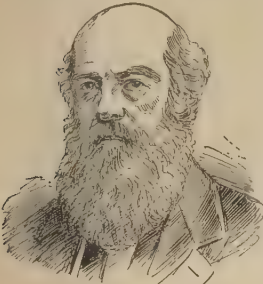
OLIFANT RIVER, a forked stream of Cape Colony, which rises in the mountains N.E. of Cape Town, and, after a northwesterly course of 150 miles, enters the Atlantic. Area of drainage basin, 13,000 square miles. Another stream bearing the same name rises in the Transvaal, and goes east to join the Oori.

OLIGARCHY, a form of GOVERNMENT; q.v., Vol. XI, pp. 10 et seq.

OLIGOCHÆTA, a family of worms. See ANNELIDA, Vol. II, pp. 68, 69.

OLIPHANT, CAROLINE. See NAIRNE, BARONESS, Vol. XVII, p. 167.

OLIPHANT, LAURENCE, a British traveler, novelist and mystic; born in 1829. He was the



LAURENCE OLIPHANT.

son of Sir Anthony Oliphant, chief justice of Ceylon, and was related to Mrs. Oliphant, the novelist, who wrote his *Life*, in 1891. In early youth he traveled in India, and visited the Nepaulese court, an account of which he published in 1852, in *A Journey to Khatmandu*. On his return to England he studied law, and was

called both to the Scottish and to the English bar, but never practiced. In 1852 he paid a visit to Russia, an account of which he published in the following year, in *The Russian Shores of the Black Sea*. He then became private secretary to the Earl of Elgin, at the time Governor-General of Canada, whom, later, he accompanied on his embassy to China. The fruits of these sojourns were a volume on *Minnesota and the Far West* (1855) and *A Narrative of the Earl of Elgin's Mission to China and Japan* (1860). In 1861, while acting as *chargé d'affaires* in Japan, he was severely wounded by assassins, and in consequence resigned his post in the diplomatic service. For several years he sat in the English Parliament and also contributed to the British press. In 1870 he published a clever and witty book, *Piccadilly*, followed by *The Tender Recollections of Irene Macgillicuddy*, and by other promising stories which originally appeared in *Blackwood's Magazine*. Unfortunately, about this time his bright career was overcast by a religious mania which seized him, under the influence of T. L. Harris, whose spiritualistic community he joined in the United States. After breaking away from the latter's dominant personality he settled at Haifa, in Palestine. The fruit of his peculiar religious opinions afterward appeared in *Sympneumata* (1886) and *Scientific Religion* (1888), as well as in a novel entitled *Masollam* (1886). His other writings, besides a novel, *Altiora Peto* (1883) and *Episodes in a Life of Adventure* (1887), are: *The Transcaucasian Campaign under Omar Pasha* (1856); *Patriots and Filibusters* (1860), *The Land of Gilead* (1881); *Traits and Travesties, Social and Political* (1882); *The Land of Khemi* (1882); and *Haifa* (1887). He died in Twickenham, near London, Dec. 23, 1888.

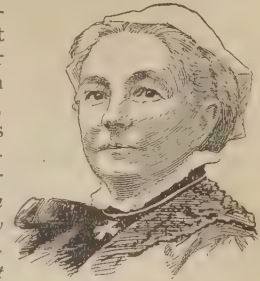
OLIPHANT, MRS. MARGARET (WILSON), a British novelist and biographer, and a prolific writer; was born in 1828, near Musselburgh, Scotland, and died in London, June 25, 1897. The first of her numerous works of fiction, which abound, in part, in delightful delineations of Scottish life and character, with other and varied studies of English domestic and social life,

appeared in 1849, under the title of *Passages in the Life of Mrs. Margaret Maitland*. This won for its author instant success, and she followed it

by a number of other stories, always written in easy, unaffected English, and with a scrupulous regard for conventionalities. The best of her early novels are *Adam Graeme of Mossgray* (1852); *Magdalen Hepburn* (1854); *Katie Stewart* (1856); and *The Quiet Heart* (1856). These are characterized by much delicate and quiet humor, with occasional touches of tender pathos. In 1866 her fame as a novelist was much heightened by the publication, in *Blackwood's Magazine*, of *The Chronicles of Carlingford*, and its pendant, *Salem Chapel*, the latter dealing with English dissent. These were followed by a sheaf of novels in a wide range of fiction, in which Mrs. Oliphant interests without descending to sensation or touching forbidden themes. Her later stories, which were most successful, are *The Perpetual Curate* (1864); *Miss Marjoribanks* (1865); *Agnes* (1866); *John* (1868); *The Laird of Norlaw* (1869); *White Ladies* (1871); *The Cuckoo in the Nest* (1892); *The Second Son* (1888); *He That Will Not When He May* (1880); *The Heir Presumptive and the Heir Apparent* (1891); *Kirsteen* (1890); *The Ladies Lindores* (1883); and *The Marriage of Elinor* (1893). A civil-list pension of £100 was conferred on Mrs. Oliphant in 1868. In addition to her industry as a novelist, she published the following biographies: *Life of Edward Irving* (1862); *St. Francis of Assisi* (1870); *A Memoir of Count de Montalembert* (1872); with monographs on *Dante* and *Cervantes* in the series, which she edited, of Foreign Classics for English Readers. In 1888 appeared her *Memoirs of Principal Tulloch*; in 1891, a *Life of Laurence Oliphant*; in 1893, a study of *Thomas Chalmers*; and in 1896, *Joan of Arc*. She also wrote a work entitled *Royal Edinburgh* (1890), and a series of antiquarian and art volumes, on *The Makers of Florence* (1876); *The Makers of Venice* (1888); and *Jerusalem* (1894). In criticism she produced *The Literary History of England from 1790 to 1825* (1882); and a continuation, *The Victorian Age of English Literature* (1892). *A Little Pilgrim* (1882), speculations about the unseen world, though published anonymously, is understood to be from Mrs. Oliphant's pen.

OLIVENZA, a fortified town of Spain, near the Portuguese frontier, 20 miles S.W. of Badajoz. Population, 7,759.

OLIVER, PETER, an American jurist and Tory; born in Boston, Massachusetts, March 26, 1713. He was an ardent Tory, and on account of his sympathy for the crown, although without an extended knowledge of law, he was appointed a justice of the Massachusetts supreme court in 1756. He became chief justice in 1771, but almost immediately quarreled with the legislature



MRS. OLIPHANT.

by reason of his refusal to accept a salary from the state of Massachusetts, instead of his income from England. He was impeached, and was obliged to give up his seat; went to England after the Revolution, and was pensioned by the government until his death, which occurred in Birmingham, England, Oct. 13, 1791.

OLIVER OPTIC. See **ADAMS, WILLIAM TAYLOR**, in these Supplements.

OLIVET, a village of Eaton County, in central southwestern Michigan, 30 miles S.W. of Lansing, on the Chicago and Lake Huron railroad; known principally as having Olivet College (non-sectarian) a co-educational institution organized in 1859, and having, in 1896, 20 instructors, 400 pupils and a library containing 24,000 volumes. Population 1895, 763.

OLIVIDÆ, a family of gasteropod mollusks especially abundant in tropical seas. The beautiful oval shells known as olive shells are eagerly sought by collectors. The harp-shells belong to the family. Many species are found in the United States.

OLIVINE GROUP. See **MINERALOGY**, Vol. XVI, p. 410.

OLLIVIER, ÉMILE, a French statesman; born in Marseilles, July 2, 1825. Having studied law in Paris, he began to practice as an advocate in that city, and by clever pleading established a reputation at the bar, and after 1864 acquired influence as a member of the Legislative Assembly. In 1865 the viceroy of Egypt appointed him to a high judicial office in that country. But he still took an active interest in French politics, and in January, 1870, Napoleon III charged him to form a constitutional ministry. He was displaced after the first reverses in the rash invasion of Germany, and retired to Italy. He wrote *Lamartine* (1874); *Thiers* (1879); *L'Église et l'État au Concile du Vatican* (1879); *Principes et Conduite* (1875); *Nouveau Manuel de Droit Ecclésiastique Français* (1885); *1789 et 1889* (1890); and other books of a historical and political character.

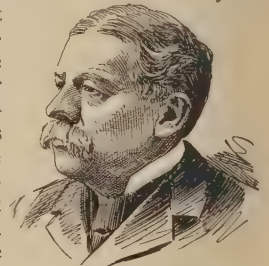
OLMSTED, FREDERICK LAW, an American landscape-gardener; born in Hartford, Connecticut, April 26, 1822. He attended Yale College, taking studies relative to agriculture. In 1848 he was on a farm on Staten Island and while there developed a taste for landscape-gardening. He spent the year 1850 in walks through England and parts of the Continent for the purpose of observing the condition of landscape-gardening there. He published an account of this tour under the title *Walks and Talks of an American Farmer in England* (1852). He afterward published three volumes—*A Journey in the Slave States* (1856); *A Journey Through Texas* (1857); and *A Journey in the Black Country* (1860)—in which he gave the results of his observations of negro labor in the south. He superintended the laying out of Central Park, New York; the Capitol grounds, Washington; the World's Fair grounds in Chicago in 1893; and various parks in Brooklyn, Buffalo, Chicago and other cities. He was secretary of the Sanitary Commission during

the Civil War, and a member of the California Yosemite Restoration Commission in 1863-65.

OLNEY, a city in the township of the same name, and the capital of Richland County, southeastern Illinois, about 115 miles from St. Louis, Missouri, 31 miles from Vincennes, Indiana, and 53 miles from Mattoon, Illinois, on the Baltimore and Ohio Southwestern and the Peoria, Decatur and Evansville railroads. It is handsomely built, containing, among other structures of note, a county courthouse, school-building and national bank, ten churches, three flouring-mills, a brass-foundry and woolen manufactory. The city supports three weekly papers. Population 1880, 3,512; 1890, 3,831.

OLNEY, JESSE, an American educator; born in Union, Connecticut, Oct. 12, 1798. From 1819 to 1831 he was principal of the Hartford Grammar School. While holding that position he published his *Geography and Atlas* (1828), which was used throughout the United States as a text-book. Later, he published a *History of the United States, a Common-School Arithmetic*, and other text-books. He was a member of the Connecticut legislature, and was active in the establishment of the public school system. He died in Stratford, Connecticut, July 31, 1872.

OLNEY, RICHARD, an American statesman; born in Oxford, Massachusetts, Sept. 15, 1835. He was graduated from Brown University in 1856, and spent the next three years at the Harvard Law School. He was admitted to the bar of Massachusetts and began the practice of his profession in Boston. He was successful as a lawyer, and took high rank in his state. Beyond holding a seat in the Massachusetts legislature in 1874, he took no part in politics. He was chosen by the Democratic party once as their candidate for attorney-general of Massachusetts, but was defeated in the election. He was made a member of Cleveland's second Cabinet, holding the portfolio of Attorney-General. Upon the death of Secretary of State Gresham, Olney was appointed to the vacancy, June 10, 1895.



RICHARD OLNEY.

OLSHAUSEN, JUSTUS, a German Orientalist; born in Hohenfelde, Holstein, May 9, 1800. In 1823-52 he was professor of Hebrew at Kiel; in 1853-58 at Königsberg; and a member of the Ministry of Instruction of Prussia in 1858-74. He published a number of works on Oriental subjects, on Hebrew language and archæology. Among such works is his Hebrew *Lehrbuch* (1861). He died in Berlin, Dec. 28, 1882.

OLYMPIA, a city and the capital of the state of Washington, and of Thurston County, on a peninsula at the southern extremity of Puget Sound, 100 miles N. of Portland, Oregon, on the Northern Pacific and Port Townsend Southern railroads. The harbor is safe and commodious,

and is especially adapted for the lumber trade and for ship-building. An abundant water-power is afforded by the Des Chutes River, and magnificent forests supply immense quantities of lumber. It has the only plant in the country for making water-pipe from yellow fir. Commerce and general trade are in a thriving condition, and the facilities for education are excellent. Population 1890, 4,698.

OLYMPIADS, periods of time in ancient Greece. See CHRONOLOGY, Vol. V, pp. 711, 712.

OLYMPIAN GAMES. These memorable Pan-hellenic games, which were abolished by the Emperor Theodosius in A.D. 394, are past beyond restoration, but a reminiscence of them was attempted, April 6-9, 1896, in Athens. The suggestion of reviving these sports came from Baron de Coubertin, a French lover of athletic games, and he was supported by the French Union of Athletic Clubs. The project appealed to Hellenic pride, and rich Greeks in London, Paris and Alexandria gave freely to this purpose. The old Stadium at Athens had been excavated in 1869-1870, and Mr. Averoff of Alexandria bore the cost of its restoration for the purpose of reviving there scenes that his ancestors applauded centuries before at Olympia, in Elis. The Stadium is 656 feet long and 160 wide, and can seat nearly 50,000 persons.

It was thought that a generous rivalry of civilized nations might replace the old competition of the states of Hellas, and that amateur sport might come to a wider recognition should representatives of the youth of different nations contend for crowns of olive and laurel in classic Athens. Competitors came forward from Greece, France, Germany, England, Australia and the United States. Of the ancient games, the chariot-races, boxing and wrestling matches were not revived; the foot-races and throwing the discus had the traditions of twenty-six centuries behind them; but vaulting, hurdle-racing, the hop-skip-and-jump, fencing and bicycling were contributions of modern athletics to the contest. There were 44 events to come off in four days, and the King presided. It is believed that the games were witnessed by 100,000 persons, many of whom were visitors in Athens. To all the citizens gave a generous hospitality, and while desirous that the honors should fall to their own youth, gave cordial recognition to the victors from beyond the seas. The principal event was a foot-race from the battle-field of Marathon to the goal at the Stadium, a distance of 26.1 miles, over the road taken by the messenger of Miltiades, who reached Athens with breath enough to cry the defeat of the Persians and then fell dead in his tracks. Appropriately, this race was won by Loues, a Greek peasant, who made the distance in 2 hours 48 minutes. It was the only victory that fell to the Greeks, but it was the most notable one. A Princeton student, Robert Garrett, threw the discus 95.6 feet, exceeding by 6 inches the ancient record of Phayllus. Of the other principal contests

the Americans carried off the honors for the hop-skip-and-jump, the long jump, the 400-meter race, and putting the weight; a Dane won the first place in weight-lifting; an Australian took the olive wreath for the 1,500-metre race; while for bicycling and fencing, that distinction fell to the French.

The prizes were conferred by the King of Greece, and consisted of olive crowns for the winners and laurel crowns for those who stood second. The festival ended with a royal banquet and a purpose to count an Olympiad to another set of similar international athletic games.

OLYMPIC GAMES. See GAMES, Vol. X, pp. 63, 64; and OLYMPIA, Vol. XVII, pp. 765, 766.

OLYPHANT, a borough of Lackawanna County, northeastern Pennsylvania, on the Lackawanna River, and on the Delaware and Hudson railroad, eight miles N. of Scranton. It is an important mining-town, and enjoys a large trade connected with the coal business. Population 1890, 4,075.

OMAHA, a city of Nebraska, one of the greatest wholesale points in the West, on the Chicago, St. Paul, Minneapolis and Omaha, the Fremont, Elkhorn and Missouri Valley, the Missouri Pacific, the Chicago, Burlington and Quincy, Chicago, North-Western and Wabash, and the Chicago, Rock Island and Pacific railroads. It has 9 national and 2 state banks; 4 parks, containing over 700 acres and connected by boulevards; 70 churches divided denominationally as follows: 15 Presbyterian, 15 Methodist Episcopal, 12 Congregational, 9 Roman Catholic, 8 Baptist, 7 Protestant Episcopal, 2 Christian, 1 Unitarian and 1 Latter-Day Saints. The educational institutions are Creighton College (Roman Catholic), founded in 1878, having, in 1896, 36 instructors, 220 pupils, and a library containing 9,000 volumes; two medical colleges, Brownell Hall (Protestant Episcopal) and the Academy of the Sacred Heart (Roman Catholic); St. Catherine's Academy (Roman Catholic). Omaha has six libraries with 50,000 volumes, and a free public library containing over 40,000. It has the Institute for the Deaf and Dumb, founded in 1878, which has art, sewing, painting and carpentry departments; the Home Fire Insurance Company, with a guaranteed capital of \$100,000; the Omaha Fire Insurance Company, with a guaranteed capital of \$100,000; the Union Life Insurance Company, with a capital of \$125,000; and is the third pork-packing center in America. It has a water-plant costing \$7,000,000, which has a capacity of 50,000,000 gallons daily; a large distillery, besides three large breweries. All the vast Union Pacific system is managed directly from the Union Pacific Headquarters Building in Omaha, employing in the city 2,400 men, with a monthly payroll of \$160,000.

Total number of mechanical and manufacturing establishments reporting in 1890, 675; aggregate capital invested, \$18,319,594; total value of products, \$42,339,321; average number of employees, 9,414; average total wages, \$6,115,294.

Population 1890, 140,452. See also OMAHA, Vol. XVII, p. 771.

OMAHAS. See INDIANS, Vol. XII, p. 832.

OMAN, DISTRICT OF. See ARABIA, Vol. II, pp. 238-240.

OMBAY OR ALLOR, a small island of the Malay Archipelago, lying north of the island of Timor from which it is separated by Ombay Strait, in lat. $8^{\circ} 5' S.$ and long. $125^{\circ} 15' E.$ The island is mountainous and of volcanic origin. It has a length of 65 miles and a width of 12 miles. The inhabitants are a savage race of negro and Malay origin. The Dutch have a settlement at Allor, where a trade in wax, edible bird's-nests and pepper is carried on. Estimated population in 1895, 104,000.

OMAR PASHA, a Turkish general; born in Plaski, Croatia, in 1806. His father was an Austrian officer. The son, under his proper name, Mikail Lattas, served for a time in the Austrian army. To escape punishment for some breach of discipline, he fled to Turkey, and there, having embraced the Moslem faith, changed his name to Omer. He became connected with the households of several high officials, and was made tutor to the heir apparent to the Turkish throne. He was advanced rapidly in rank and position, was made Pasha in 1843, and given command of the army in Armenia and Bosnia. He was at the head of the Turkish forces against the Russians in 1853-56, and was successful in every battle, with the exception of Kars. He was afterward governor of Bagdad, and put down the rebellion of the Montenegrins in 1862. He was active in the ministry until 1869, after which, until his death, April 18, 1871, he was an advisory minister only.

OMAYYADS, a Turkish dynasty. See MOHAMMEDANISM, Vol. XVI, pp. 565-577.

OMMANNEY, SIR ERASMUS, a British admiral; born in London in 1814. He entered the navy in 1826; served against Portugal in 1827; was with James Ross in the Arctic expedition of 1835; became commander in 1840 and cruised in the Mediterranean. As captain, he was one of the government relief committee during the Irish famine of 1846, and in 1850 went with Austin on the Franklin expedition relief. On this expedition he made valuable explorations. He was deputy controller of the British coast guard until 1854, when he was assigned to the command of the White Sea squadron in the war with Russia. He was promoted rear-admiral in 1864, and knighted. He soon retired from service and devoted himself to astronomical study. He was a member of different parties which went to Upper Egypt to observe the eclipse of the sun, and the transit of Venus.

OMNIBUS, STEAM. See AUTOMOBILE VEHICLES, in these Supplements.

ON, an ancient Egyptian city, also called Heliopolis. See EGYPT, Vol. VII, p. 769.

ONAGER OR KOULON, a wild ass of Central Asia. See ASS, Vol. II, p. 717.

ONATE, JUAN DE, the first governor of New

Mexico; born in Guadalajara, Mexico, about 1555. He was a grandson, by marriage, of Cortes, the conqueror of Mexico. He was granted the province of New Mexico, the territory north of the Rio Grande, in 1595, by Velasco, but was not permitted to carry out his plans of settlement until 1598. Finally, he was allowed to proceed, by Monterey, Velasco's successor. He took with him 130 men and a large number of cattle; crossed the Rio Grande, and in August, 1598, founded San Juan, the first capital. He was governor until 1608, during that time exploring the Gila River from its source to the Gulf of California. He died about 1611.

ONAWA, a town and the capital of Monona County, western Iowa, 37 miles S.S.E. of Sioux City, and 4 miles E. of the Missouri River, on the Illinois Central, Chicago and North-Western and Sioux City and Pacific railways. It is situated in an agricultural and stock-raising district. Population 1890, 1,358; 1895, 1,675.

ONCHIDIUM, a genus of air-breathing gasteropod mollusks, found in warm regions. Some species are terrestrial, others aquatic. An Indian species which lives on the shores between tide-marks is of great interest because of the condition of the eyes. These are scattered over the whole upper surface, and in their structure and development closely resemble the vertebrate eye.

ONEIDA, a village of Madison County, New York, 26 miles E. of Syracuse, on the New York Central and Hudson River and the New York, Ontario and Western railroads. It is in a hop-growing and agricultural country, and has flour, planing and knitting mills and steam-engine works. Population 1890, 6,083.

ONEIDA INDIANS. See INDIANS, Vol. XII, pp. 827, 832; and IROQUOIS in these Supplements.

ONEIDA LAKE, a body of water in Onondaga, Madison, Oswego and Oneida counties, northwestern New York; greatest length 20 miles, width 6 miles; formerly the channel of an important navigation. Oneida River, its outlet, is 18 miles long, and falls into Oswego River.

O'NEILL, a village and the capital of Holt County, northeastern Nebraska, 38 miles S.W. of Nebraska City, on the Fremont, Elkhorn and Missouri Valley and the Sioux City, O'Neill and Western railroads; has railroad repair-shops. The district is devoted to agriculture and stock-raising. Population 1890, 1,226.

ONEONTA, a village of Otsego County, in southeastern New York, 60 miles E. of Binghamton, on the Coopertown and Charlotte Valley and the Albany and Susquehanna railroads, and on the Susquehanna River. It contains the State Normal School, burned and rebuilt in 1894; a public library with 4,000 volumes; the shops of the Delaware and Hudson River railroad, three planing-mills, two grain-elevators and piano, cigar and shirt factories. Population 1890, 6,272.

ONION. See HORTICULTURE, Vol. XII, p. 285.

ONOMASTICON. See POLLUX, JULIUS, Vol. XIX, p. 403.

ONONDAGA INDIANS. See INDIANS, Vol. XII, pp. 827, 832; and IROQUOIS in these Supplements.

ONONDAGA LAKE, in Onondaga County, two miles N.W. of Syracuse; about five miles in length and one mile wide, its greatest depth being 65 feet. It lies in an ancient and deep excavation in the Onondaga salt group; in the vicinity of this lake are the most productive salt-springs of the United States. Its waters pass by a short outlet to Seneca River.

ONTARIO. In the Canadian Dominion, the province of Ontario (formerly called Upper Canada) holds the chief place, since it is the wealthiest and most populous province, and the most progressive of the commonwealths within the Confederation. Its area is 222,000 square miles, of which only the south-eastern portion as yet is populated. This is the region bounded on the north and east by the St. Lawrence and the Ottawa rivers, and on the south and west by Lakes Ontario, Erie and Huron, with its inland expanse of the Georgian Bay. Within this area the population of the province (which, in 1891, was 2,114,321) is mainly to be found; the remainder being sprinkled along the lines of sparse settlement in the wilderness extension of Ontario, westward to the Lake of the Woods, and northward to the Albany River and James's Bay. The physical aspect of Ontario is unmarked, save for its abounding water. Nowhere do the elevations exceed one thousand feet, and this chiefly along the Laurentian ridge (locally known as the "Height of Land"), that trends northwestward from Labrador, and back of the older and settled portions of the province. South of this ridge, which forms the watershed of the region, the rivers drain into the St. Lawrence system; north of it, they drain chiefly into Hudson Bay. The eastern and southern portions of Ontario, which include the rich and fertile peninsula surrounded by the lakes, is divided, for municipal and electoral purposes, into 42 counties. This is the region of agricultural operations and cognate pursuits, and of the industries that contribute to the commerce and consequent wealth of Ontario. The larger and newer area of the province, lying to the north and west of the more compact and organized section, is divided into six provisional districts, known as Muskoka, Parry Sound, Nipissing, Algoma, Thunder Bay, and Rainy River. Here, chiefly, the lumberman and miner find their field of exploits,—the region, so far as it has been surveyed, being rich in arboreal and mineral wealth. The winter in this northern latitude is long, and as a rule severe, and there is usually a heavy snowfall. At Port Arthur, at the head of Lake Superior, and 610 feet above the sea, the mean temperature in summer is 55°, and in winter 9°. At Ottawa City the summer average is 65° and the winter 15°, while at Toronto, the provincial capital on Lake Ontario, the summer average is 64° and the winter 24°.

The climate in the Ontario peninsula is very favorable for farming, cattle-raising, and the growing of the hardier grain and root crops. Horses and cattle thrive well in this region of the province, and find rich pasture. The area of occupied land is in the neighborhood of twenty-three million acres, about half of which is cleared. A little over eight million acres of the cleared land was, in 1894, under

crop, while two and three quarter million acres were under pasture, and close upon two hundred thousand acres were in gardens and orchards. In 1894 the cultivated acreage was mainly given to oats, hay, clover, peas and barley. Wheat (chiefly fall wheat) was raised from a million acres; but of recent years wheat in Ontario has been a precarious and unremunerative crop. In the same year there were about eight million acres in woodland. The yield, in bushels, of the chief field crops was, for 1894, as follows: Wheat, 20,000,000; oats, 70,000,000; barley, 11,000,000; peas, 14,000,000; turnips, 61,000,000; potatoes, 17,000,000; corn (for husking), 16,000,000; mangel-wurzels, 11,500,000. The yield of hay and clover for the same year was 3,500,000 tons. This cereal yield, though it is eclipsed by Manitoba, and by a number of the grain-growing Western states of the Union, is, on the whole, a fair showing, and is better than the yield in such states as New York and Pennsylvania, while the average yield per acre is higher. Cheese-making, as has been said in the statistics of the Dominion, is a large and profitable industry in Ontario. The number of factories operated in the province in 1894 was 1,011, the average output per factory, for the year, being over ninety-six thousand pounds. The cheese sales averaged, for 1894, \$9.70 per 100 pounds.

Ontario has a prosperous showing in the raising and annual sales of live-stock. The value of horses of all kinds in the province, for the year 1894, was close upon \$50,000,000, while the yearly sales average eight per cent of the total. The province owns, in value, about \$50,000,000 worth of cattle, of which the annual sales aggregate over \$15,000,000. The value of sheep owned in the province, for the same year, exceeded \$8,500,000, and the sales netted over \$2,500,000. The sales of hogs for the year returned over \$10,000,000. Of poultry (turkeys, geese and other fowls), \$782,588 worth were sold in the year 1894, out of a total value of nearly \$2,300,000 owned in the province. The net amount realized from sales of live-stock of all kinds for the year 1894 was, for the entire province, about \$32,000,000, the average per head being as follows: Horses, \$77; cattle, \$34.46; sheep, over one year, \$5.14; under one year, \$3.26; hogs, over one year, \$13.08; under one year, \$4.30; turkeys, 67 cents; geese, 57 cents. A considerable revenue is raised in the province from wool, the clip for the year 1894 being over 6,000,000 pounds. Bee-culture is also a profitable industry in Ontario, while a large sum is derived annually from the apple and grape crops.

The statistics of the province show a decline, in recent years, in the value of farm property, including farm-lands and live-stock, though there is an increase in the value of buildings and implements. The estimated total value of all farm property, including lands, buildings, implements and stock throughout the province, was, in the year 1894, \$954,000,000. The average value of farm-land in the province, per acre occupied, was, in 1894, \$25.49; in 1883 it was \$30.56.

The mineral wealth of Ontario, now that lumbering has receded and become less profitable, is at last in a fair way to be developed. The provincial

government has established a bureau of mining, and issued a report of the labors of a royal commission, appointed to inquire into the mineral resources of Ontario and to suggest measures for their development. The report confirms the conclusion already reached by prospectors, that the province contains almost all of the economic minerals in workable quantities, except coal, and "that it has vast possibilities of mineral wealth." The drawbacks to the development of that wealth are the want of access to a near and free market, the lack and great cost of machinery, and the absence of facilities for cheap transportation. Despite the unfavorable economic conditions, much has been attempted by the province in prospecting regions rich in ores, especially the Sudbury district, north of Lake Nipissing, where copper and nickel mines are already being worked, and the silver district west of Port Arthur. So far as the province has been examined by experts, there is conclusive evidence of the abundance, in the central and eastern counties, of magnetic and hematitic iron ores, gold, galena, plumbago, arsenic, mica, fibrous serpentine, apatite, granite, marble and freestone. Along the north shore of Lake Huron, from the mouth of the French River to Sault Ste. Marie, gold and silver bearing veins, iron, copper, galena and immense quarries of marble have been discovered. Other parts of the province are also rich in a great variety of valuable ores. American and Canadian mining companies are, in many promising sections, beginning operations, while a Welsh mining corporation, with large capital, has already got to work. Already the mineral yield for one year has reached six million dollars, of which one third was expended for labor.

The trade of Ontario grows apace. It has received, of late, moreover, a considerable impulse in the opening up of the Northwest. Manufactures, taking advantage of cheap labor and the abundant water-power of the province, have sprung up extensively along the St. Lawrence, around the lakes and on the larger waterways of the peninsula. These include ship-building, woolen and cotton products, edged tools, stoves, agricultural implements and machinery of all kinds, tram and car building, woodenware, doors and window sashes, and furniture, organs, pianos, trunks, leather goods, boots and shoes, etc. Many of these articles are exported largely to foreign and other colonial markets. The exports of the province can only approximately be given, for the reason that much of the volume of shipments pass through the seaports of Quebec and the maritime provinces, where they are recorded in Dominion rather than in provincial statistics. It is estimated, however, that the annual exports of Ontario amount to \$35,000,000 and the imports to \$50,000,000. Of the 38 banks making returns to the Dominion government in 1894, ten of them are Ontario institutions and have their head offices within the province, with a capital bordering on \$16,000,000. There were, in 1894, 89 loan and investment companies and building societies doing business in the province, with an aggregate capital and reserve fund of \$93,000,000 and total assets of \$137,500,000.

The Dominion census of 1891 gives Ontario a population of 2,114,321; the municipal assessors place the figures, for the same year, at 1,922,121, with a gross property assessment of the value of \$819,000,000. The population is distributed thus: In townships, 1,116,347; in towns, 296,675; in villages, 128,634; and in cities, 386,465. The cities, twelve in number, are as follow, the population being that estimated for the year 1895: Toronto (the capital of the province), 188,914; Ottawa (the capital of the Dominion), 47,750; Hamilton, 49,100; London, 34,400; Kingston (1891), 19,264; Brantford, 15,054; Belleville, 11,025; Guelph, 10,500; St. Catharines, 9,423; Stratford, 10,600; St. Thomas, 10,563; Windsor, 11,450. Classified by religions, the provincial returns show that 647,518 were Methodists, 452,712 Presbyterians, 385,999 Church of England, 358,330 Roman Catholics, 96,969 Baptists and 72,228 were Lutherans, Congregationalists and members of the Salvation Army.

Toronto is the seat of the provincial government and High Courts of Justice. The affairs of the province are administered by an executive and Legislative Assembly, or Parliament, with a lieutenant-governor, who is advised by the executive, or cabinet, composed of eight members. The constituencies are represented in the local legislature by 93 members, including the executive, who are responsible to the legislature, which meets annually. The province is represented in the Dominion or Federal Parliament by 24 members in the Senate, appointed by the crown, and by 92 members in the House of Commons, elected by the people. Unlike the other provinces of the Dominion, Ontario has no public debt, if we except a subvention in aid of local railways, amounting to \$1,250,000, payable within forty years. Instead of a debt, the province has assets of the value of \$5,000,000 in investments, bank balances, and debts (bearing interest) due it by the Dominion. The financial expenditure of the province for the year 1894 was \$3,842,505, and the receipts were \$3,528,179. The chief sources of the revenue are the receipts from crown lands and the annual Dominion subsidy, the province's proportion of the excise and customs levies.

Besides the expenditure by the legislature for the maintenance of hospitals and charities and the administration of justice, Parliament appropriates nearly \$700,000 annually for the purposes of education. This, of course, is in addition to the sum (close upon \$3,500,000 annually) raised by local assessment as a school tax. The number of schools in the province, in 1894, was 5,900, with an average attendance of 260,000 and a staff of 8,500 teachers, two thirds of whom were women. There were also 312 separate (Roman Catholic) schools, with 38,000 pupils, and a staff of 660 teachers. The province also maintains, besides two normal schools and a number of county model schools, 128 secondary schools for higher education, of which 35 are collegiate institutes. In the latter there is an average attendance of 13,500, with 520 teachers. At the head of the educational system stands the National University (Toronto University and College). It is undenominational, and has affiliated with it a number of theo-

logical colleges, schools of law, medicine, science, music, dental surgery and pharmacy. The other provincial colleges are Queen's (Presbyterian), at Kingston; Victoria (Methodist); Trinity (Episcopal); Wycliffe (Episcopal); McMaster (Baptist); St. Michael (Roman Catholic); and Upper Canada College (Boys' Resident), at Toronto.

ONTARIO, FORT, a fortification at the mouth of the Oswego River, on the eastern bank, near Oswego, New York. It guards the river mouth and the entrance to the harbor. This fort was built by the British in 1756, and was captured by the French under Montcalm that same year. The fort was burned by the French, but rebuilt by the British later, and was the last fortress to be surrendered by the British at the close of the Revolution.

ONTARIO, LAKE. See ST. LAWRENCE, Vol. XXI, p. 180, and Vol. XIV, p. 217.

ONTOLOGY. See METAPHYSIC, Vol. XVI, pp. 79-98.

ONTONOGAN, a village and the capital of Ontonogan County, Northern Michigan, forty miles W. of Keenewaur Bay, on the Ontonogan River, and on the Chicago, Milwaukee and St. Paul railroad. It has a copper-smelting furnace, a grist-mill, two steam saw-mills and a cigar factory. Copper is the chief article of export, and is mined about 15 miles from here. Population 1895, 2,070.

ONYCHOTENTHIDÆ. See MOLLUSCA, Vol. XVI, p. 670.

ONYX MARBLE. See MARBLE, Vol. XV, p. 529.

OÖGAMY, a botanical term to denote that the sexual apparatus of a plant consists of the female organ known as the *oögonium*, which contains an *oösphere* (the female gamete) that is fertilized by the male gamete. Oögamy is characteristic of certain algæ and fungi, and is distinguished in the same groups from *isogamy*, in which the gametes are alike, and *carpogamy*, in which the female organ contains no organized oösphere, and is therefore not an oögonium. (See OÖGONIUM in these Supplements).

OÖGONIUM, a botanical term to denote a unicellular female organ in which a female gamete

(*oösphere*) is differentiated. Oögonia are present in certain algæ and fungi, and in them the process of fertilization takes place. In the accompanying figure, A represents a portion of the filament of *Cedogonium*, a common green alga. One of the cells (o) has developed into an oögonium, which contains a single large oösphere (female gamete) which completely fills it. Another region of the filament (a) has divided up into three short cells, each of which

is a male organ (*antheridium*) in which is developed the male gametes (*spermatozooids*). B represents two zoöspores, or swimming spores, from the same fila-

ment, each of which has the power of producing a new filament, but which has no connection with the sexual work. See MORPHOLOGY in these Supplements.

OÖLITIC LIMESTONE. See GEOLOGY, Vol. X, pp. 354-356; and BUILDING, Vol. IV, p. 459.

OÖRI, a river of southeastern Africa, which has its source in the heart of the Transvaal, between Pretoria and Potchefstroom, describes a huge curve to the north and joins the Indian Ocean a little north of Delagoa Bay. Its course exceeds eight hundred miles, and it has numerous tributaries, the most important being the Olifant, from the right. It has been ascended fifty miles by steamboat, but its upper reaches are obstructed by rapids and falls.

OÖSPHERE, a botanical term applied to the female sex-cell, or gamete, which is fertilized by the male cell. It is usually developed in distinct female organs (oögonia and archegonia). See ARCHEGONIUM and MORPHOLOGY, in these Supplements.

OÖSPORE, a botanical term applied to the cell which results from the fertilization of an oösphere, is the first cell of a new generation, and in the case of alternate generations, the first cell of the sporophyte. See also MORPHOLOGY in these Supplements.

OOSTERHOUT, a town in North Brabant, Holland, six miles N.E. of Breda. It contains sugar factories, tanyards, breweries and potteries. Population, 10,911.

OPACITE, a name given by petrologists to minute black, opaque, amorphous aggregates, grains and patches of indeterminate mineral matter, which are seen in many igneous rocks when these are viewed in thin slices under the microscope. Opacite is probably, in most cases, hematite, limonite, magnetite, or other iron oxide, and is a product of the chemical alteration of one or other of the original mineral constituents of the rock in which it occurs.

OPELIKA, a city and the capital of Lee County, eastern Alabama, on the Central of Georgia, the Opelika and Auburn and the Western and Alabama railroads, 27 miles N.W. of Columbus. It is in a grain and cotton-growing district, handles large quantities of cotton, groceries, dry-goods, and has several flour-mills and cotton warehouses. Population 1890, 3,703.

OPELOUSAS, a town and the capital of St. Landry Parish, Louisiana, 60 miles W. of Baton Rouge, on the Southern Pacific railroad. It contains a convent and an academy, and is in a cotton, corn, rice and live-stock district. Population 1890, 1,572.

OPEN-HEARTH STEEL. See IRON AND STEEL, in these Supplements.

OPERA, a musical drama. See MUSIC, Vol. XVII, pp. 86-88, 92, 94, 95, 99, 100; and MUSIC IN AMERICA, in these Supplements.

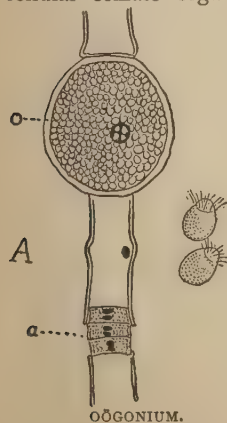
OPERA-GLASS. See TELESCOPE, Vol. XXIII, p. 139.

OPERATIVE SURGERY. See SURGERY, AMERICAN, in these Supplements.

OPHIDIA. See SNAKES, Vol. XXII, pp. 189-199.

OPHIDIIDÆ, a family of fishes. See ICHTHYOLOGY, Vol. XII, p. 691.

OPHIOCEPHALIDÆ, a family of fresh-water



is a male organ (*antheridium*) in which is developed the male gametes (*spermatozooids*). B represents two zoöspores, or swimming spores, from the same fila-

fishes peculiar to Asia. These fishes possess an accessory chamber which retains water to moisten the gills. They breathe air direct, and are able to remain out of water for a long time. They are known as walking-fishes, because of their habit of traveling across land. During droughts they burrow in the mud. Their usual habitat is the shallows near the shores. Some species are edible.

OPHIOGLOSSACEÆ, one of the families of ferns, often known as the adder's-tongue family, and composed of rather small ferns, with sessile globular spore-cases (sporangia), opening transversely, and without the ring (*annulus*) found in the ordinary ferns. There are three known genera, *Botrychium*, with sterile part of the frond compound and sporangia in compound spikes; *Ophioglossum*, with sterile part of the frond mostly simple, and the sporangia in a simple spike; and *Helminthostachys*, a genus of the Oriental tropics, with but a single species. The species of *Botrychium* are known as moon-worts; those of *Ophioglossum* as adder's-tongues.

OPHITES. See Gnosticism, Vol. X, pp. 702, 703.

OPHITIC STRUCTURE. Same as *Diabase Structure*, in GEOLOGY, Vol. X, p. 235.

OPHIURIDEA, an order of star-fishes. See ECHINODERMATA, Vol. VII, pp. 634, 635.

OPHTHALMOSCOPE. See OPHTHALMOLOGY, Vol. XVII, p. 786.

OPISTHOBRANCHIA, an order of gasteropodous mollusks, opposed to PROSOBRANCHIA; q.v., in these Supplements, and see MOLLUSCA, Vol. XVI, p. 655.

OPISTHOCOMI, a group of birds, equivalent to the *Heteromorphæ* of Huxley. The group contains the single genus *Opisthocomus*. This genus has one species, the hoactzin of South America. A full account of this interesting bird may be found under HOACTZIN, Vol. XII, p. 28.

OPPERT, JULES, a French Orientalist; born in Hamburg, July 9, 1825, of Hebrew parentage. He studied at Heidelberg, Bonn, Berlin, and the University of Kiel. He was appointed professor of German in the Lyceums of Laval and Rheims, France, and was a member of a government scientific expedition to Mesopotamia. In 1854 he laid before the French Institute his method of deciphering the cuneiform inscriptions, and received for his achievement the grand prize of twenty thousand francs. In 1857, Oppert was made professor of Sanskrit in the school attached to the Imperial Library. In 1869 he also began to teach in the Collège de France, and in 1874 he was made full professor there. Among his published works are *Assyrian Studies* (1860); a *Sanskrit Grammar* (1857); *History of the Empires of Chaldea and Assyria* (1866); *Babylonia and the Babylonians* (1869); *The Median People and Language* (1879); and *Mythological Fragments* (1882).

OPPOLZER, THEODOR, an Austrian astronomer; born in Prague, Austria, Oct. 26, 1841. He established a private observatory in Vienna in 1865. He is known by two works, *The Determination of the Paths of Planets and Comets* (1870-80) and *The Law*

of Eclipses (1887). The latter includes a catalogue of eclipses of the sun, both annual and total, between 1200 B.C. and A.D. 2160. He died Dec. 26, 1886.

OPTIC, OLIVER, the pseudonym of ADAMS, WILLIAM TAYLOR; q.v., in these Supplements.

OPTIMISM. See PESSIMISM, Vol. XVIII, pp. 684-690.

OQUIRRH MOUNTAINS, a range in Utah, which forms the boundary of the counties of Tooele and Utah, and extends from the south end of the Great Salt Lake in a southerly direction. It abounds in carboniferous limestone and quartzite, and is the locality of some of the most productive silver-mines that have yet been exploited in this country.

ORANGE, a village of Orange township, Franklin County, northwestern Massachusetts, on Miller's River, 15 miles E. of Greenfield, on the Fitchburg railroad. It is the seat of a variety of manufactories. Population of township 1890, 4,563.

ORANGE, a city of New Jersey. It has two railroads, the Delaware, Lackawanna and Western and the Erie; is connected by electric cars with East Orange, South Orange, Bloomfield and Newark; there are six public school buildings, including a high school, a manual training school, several high grade private schools and a public library. Among its recent buildings are the Memorial Hospital, which has a training-school for nurses; the Masonic Temple, containing the post-office; the Young Men's Christian Association, which has a large hall, and the Woman's Christian Temperance Union; has two national banks with capital of \$250,000, and two savings banks with aggregate deposits of \$1,750,000. Population 1890, 18,844. See also ORANGE, Vol. XVII, p. 813.

ORANGE OR GARIEP, the largest river of South Africa. It rises in the Kathlamba Mountains, in the east of Basutoland, and flows west, with an inclination to the north, to the Atlantic Ocean. It describes numerous wide curves in its course of 1,000 miles, and separates Cape Colony on the south from the Orange Free State, Griqualand West, Bechuanaland and Great Namaqualand, on the north. Area of basin, 325,000 square miles. Its volume varies greatly between the dry season, when it is not navigable, and the rainy season, when it overflows its banks in the upper parts of its course. Its mouth, moreover, is obstructed by a bar, and its chief affluent is the Vaal.

ORANGE, FREE STATE OF. For general articles on this Republic, see AFRICA, Vol. I, p. 270; CAPE COLONY, Vol. V, p. 45; and ORANGE RIVER FREE STATE, Vol. XVII, p. 813. For late information, see AFRICA, in these Supplements.

ORANGEBURG COURTHOUSE, a village and the capital of Orangeburg County, in central South Carolina, 50 miles S. of Columbia, on the Atlantic Coast Line and the South Carolina and Georgia railroads; manufactures cotton goods, rice and wagons; has several educational institutions, including Claflin University (non-sectarian), a co-educational institution for the use of colored students, founded in 1869, which had, in 1896, 30 instructors, 570 students and a library containing 1,800 volumes. The State Agri-

cultural College is also here. Population 1890, 2,964.

ORANGE CITY, a town and the capital of Sioux County, northwestern Iowa, 32 miles N.W. of Cherokee, on the Chicago and North-Western railroad; in an agricultural and hog-raising district, and has the Northwestern Classical Academy. Population 1890, 1,246; 1895, 1,480.

ORANGE-OIL. See ORANGE, Vol. XVII, p. 812.

ORANG-OUTANG. See APE, Vol. II, p. 149.

ORATORIAN. See MONACHISM, Vol. XVI, pp. 713, 716.

ORBIGNY, ALCIDE DESSALINES D', a French naturalist; born in Coneron, Sept. 6, 1802. In 1826 he went to South America, where he spent eight years in scientific exploration from Brazil and Peru to Patagonia. In 1852 he was made professor of palæontology at the museum of Natural History at Paris. His best-known works are *Travels in South America* (1847); and *French Palæontology* (1854). He also contributed to the *Universal Dictionary of Natural History*, edited by his brother, Charles Dessalines d'Orbigny, conservator of the Museum of Natural History of Paris. He died in Pierrefitte, near Paris, June 30, 1857.

ORCEINE. See ARCHIL, Vol. II, p. 379.

ORCHARD PRODUCTS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

ORCHARDSON, WILLIAM QUILLER, a Scottish *genre* painter; born in 1835, in Edinburgh, where subsequently he studied under Scott Lauder at the Trustees' Academy. Among his works are *An Old English Song* (1863); *Scene From Shakespeare's Henry IV.* (1868); *On the Grand Canal* (1871); *The Queen of the Swords* (1877); and *A Social Eddy* (1878).

ORCHIDS, the common name of plants belonging to the family *Orchidaceæ*, an immense family of monocotyledonous plants, variously estimated to contain from 6,000 to 10,000 species. Most of the species are tropical, occurring especially as epiphytes on trees or in rock crevices. The orchids of the temperate regions are all terrestrial plants. Their very striking, irregular flowers, of the most bizarre forms, and with extremely showy coloration, elaborately adapted to the visits of insects for the purposes of cross-pollination, have made them much prized as ornamental plants.

ORCINE. See ARCHIL, Vol. II, p. 379.

ORD, EDWARD OTHO CRESAP, an American soldier; born in Cumberland, Maryland, Oct. 18, 1818. He graduated at the United States Military Academy in 1839; served in Florida against the Seminole Indians until 1842; and from that date until the beginning of the Civil War was employed chiefly on frontier duty. In September, 1861, he was appointed brigadier-general of volunteers, and soon after assigned to command a brigade of Pennsylvania reserves. On May 2, 1862, he was made major-general of volunteers and transferred to a command in the Department of the Mississippi; participated in the battle of Iuka and the action on the Hatchie; commanded the Thirteenth Army Corps during the siege and capture of Vicksburg and capture of Jack-

son; and in July, 1864, was given command of the Eighth Army Corps and the troops in the Middle Department. In January, 1865, he was given command of the Army of the James and the Department of Virginia, and took part in the operations resulting in the evacuation of Richmond and the surrender of General Lee. He then was given the Department of the Ohio. In September, 1866, he was mustered out of the volunteer service, having, however, previously been appointed a brigadier-general in the regular army. He commanded various military departments in 1866-80; and retired in 1881 with the rank of major-general. He died in Havana, Cuba, July 22, 1883.

ORD, GEORGE, an American naturalist; born in Philadelphia, Pennsylvania, in 1781. He formed the acquaintance of Alexander Wilson, and was the companion of that naturalist in many of his collecting trips. When Wilson died he left his *American Ornithology* unfinished, and Ord took up the task, completing the eighth volume in 1814; and afterward edited a new edition, adding a life of Wilson. He was an assistant editor of Webster's and Johnson's dictionaries. He died in Philadelphia, Jan. 24, 1866.

ORDER, in natural history, a group inferior to *class* and *sub-class*, but superior to *family*, *genus*, etc. The term *natural order* was used in botany formerly to express genuine relationship in contrast to purely artificial grouping, but all orders now recognized are supposed to be more or less "natural."

ORDERS, RELIGIOUS. See MONACHISM, Vol. XVI, pp. 698-716.

ORDINATION. See ORDERS, Vol. XVII, pp. 820, 821.

ORDNANCE AND ORDNANCE DEPARTMENT. See ARTILLERY and GUN-MAKING, in these Supplements.

ORDNANCE SURVEY. See SURVEYING, Vol. XXII, pp. 708-711.

ORDOVICIAN, a name sometimes given to a geological formation intermediate between Cambrian and Silurian; otherwise accounted the Lower Silurian strata. It is so called from the Ordovices, an ancient British tribe. See *Lower Silurian*, under GEOLOGY, Vol. X, pp. 331, et seq.

OREGON had a population in 1890 of 313,767, a gain of 138,999 over the preceding census return.



STATE SEAL OF OREGON.

The area of Oregon is 96,030 square miles, of which 1,470 are water surface. The density of population is 3.32 to the square mile, according to the census of 1890. In 1890 the two cities of the state having a population of 8,000 and over had 56,917 residents, constituting 18.14 per cent of the entire number of inhabitants. Of the citizens of the state, 181,840

were males and 131,927 were females; 81.73 per cent were native-born; 1,186 were negroes, an increase of 699 since 1880; 9,540 were Chinese; 25 were Japanese; and 1,258 were civilized Indians. A state census taken in 1895 gives the population at 362,762.

Agriculture. The soil of Oregon is fertile, and throughout that part of the state lying west of the Cascade Mountains and in the northern section lying east of them the rainfall is adequate for crops. In the central and southeastern portions of the state irrigation is generally necessary. By the census of 1890 the area devoted to cereals was 828,706 acres, which produced 16,423,768 bushels of grain. Of the total area devoted to the cereals, 66.74 per cent was in wheat, 26.39 per cent in oats, 4.55 per cent in barley; corn, rye and buckwheat, in the order named, occupy the remainder; 553,052 acres were devoted to wheat, the crop amounting to 9,296,734 bushels. The oat crop was abundant, the amount raised being 5,948,594 bushels; the barley crop amounted to 874,353 bushels. The number of farms was 25,530, an increase from 16,217 in 1880; the number of acres in farms increased within the period mentioned from 4,214,712 to 6,909,888, and the total value of lands, buildings, farm implements, machinery and live-stock from \$73,673,140 to \$143,024,800. Horses increased from 124,107 in 1880 to 224,962 in 1890; neat cattle from 416,242 to 520,648; milch cows from 59,549 to 114,156; swine from 156,222 to 208,259, and sheep from 1,083,162 to 1,708,312. The clip of wool also advanced from 5,718,524 to 9,982,910 pounds. Almost 500,000 acres were devoted to hay; approximately, 1,500,000 bushels of Irish potatoes were produced; more than 3,600,000 pounds of hops were raised; and the crop of pulse was in excess of 10,000 bushels.

The country west of the Cascades is adapted to dairying. The generous amount of moisture and mild temperature result in continuous green and luxuriant grasses. Cereals, hay, fruits, vegetables and berries flourish near the coast, and in the extreme southern part of the state, Curry County, figs, olives and other semi-tropical products are successfully grown. In the great Willamette valley every product known to the temperate zone can be produced. The valley is a great storehouse of agricultural wealth. Fruits grow to perfection, especially prunes, pears and apples, while root crops and vegetables thrive abundantly. Horses, sheep and swine all find the section adapted to their increase; the wool produced is of excellent quality. The wheat raised in this valley commands the highest market prices for the grain. Other portions of the state, as, for example, the Umpqua and Rogue River valleys, are essentially fruit-raising sections. Prunes, pears, peaches, plums, grapes, berries, melons and apples all do well. East of the Cascades many of the leading fruits are raised, with the aid of irrigation, in the river valleys, especially along the Columbia. Back from the valleys the great wheat-fields spread in all directions, while farther removed the stock-ranges begin.

Manufactures. According to the census of 1890, Oregon had 1,523 manufacturing industries, in which the capital invested amounted to \$32,122,-

051, the number of persons employed to 18,798, their annual wages to \$11,535,229, and the total output to \$41,432,174. Leading among the industries were car and general shop construction, \$1,750,926; fish, canning and preserving, \$1,643,324; flouring and grist-mill products, \$4,184,473; foundry and machine-shop products, \$1,209,385; furniture-factory products, \$1,270,475; lumber in its various forms, exceeding in value \$7,000,000; slaughtering and meat-packing, wholesale, \$1,570,935. The largest showing made by any county in the state was that of Multnomah, \$28,284,692.

Fisheries. In the eleventh decennial census the value of the fish products of 1889 was given at \$1,186,188. Since that date great advances have been made in the industry, legislative action has been invoked for the preservation of the fish and the regulation of the industry, and much additional capital has been invested in canneries. The census reports show 2,832 persons employed, capital to the amount of \$913,427 invested, and products amounting to \$1,176,936. This did not include the products of the salmon canneries, which were included among the manufactured products. The business has been increased from the figures given above, until, in 1895, the total value of the fisheries of the state were, approximately, \$4,500,000.

Minerals. The census reports of 1890 give the total value of the mineral products of 1889 at \$1,238,114. Some iron ore is produced, but not in large quantities. The gold output was \$964,309, and the silver \$23,382. The value of the different mining-plants was \$15,151,203, the expenditures aggregated \$1,604,781, and the wages paid were \$909,001. Rich deposits of lead, copper, cinnabar and coal are found in many portions of the state, and in Douglas County is the richest deposit of nickel thus far exposed in the United States. In Morrow County fine opals occur, and on the sea beach agates, jaspers, carnelians, jades and chalcedonies are found in abundance and of fine quality. East of the Cascades are large beds of handsome onyx-marble, and in the Siskiyou and Coast ranges are deposits of beautiful blue and gray sandstone, free in texture and of easy manipulation. Granite, marble and limestone abound in various places in great variety. Asbestos, paint-ore, fire-clay and mineral pigments exist in abundance, and are favorably situated for mining and shipment. One coal-mine in Coos County penetrates a huge bed of excellent bituminous coal, from which, from 1885 to 1895, more than 100,000 tons were annually sent to San Francisco.

Forests. More than 25,000 square miles of the mountain and coast lands of Oregon are covered with a fine growth of timber, much of it yielding in sawn lumber from 50,000 to 200,000 feet per acre. Yellow fir is one of the strongest woods known, and is in demand for the ship-yards of France and other European countries. Many other varieties of fir and many kinds of spruce and pine abound, and cedar, oak and ash exist in vast unbroken forests.

Wealth. The total equalized value of assessable property in the state (with all exemptions deducted) was, in 1895, \$144,445,426, on which a levy

of 4.8 mills for the taxes of 1896 was made. During the biennial term ending Dec. 31, 1894, the total receipts of the state treasury were \$3,003,448. This included a balance of \$341,136. The total disbursements for the term were \$2,763,091, leaving



THE CAPITOL BUILDING, SALEM.

in the treasury at the beginning of 1895, \$240,357. The public debt is practically nothing. Jan. 1, 1895, the total amount of the common-school fund amounted to \$2,450,521.

The educational, charitable and penal institutions of Oregon embrace a school for mutes, one for the blind, an insane asylum, the Reform School and a State Penitentiary located at Salem. The latter institution had, Oct. 1, 1895, 326 inmates, for the maintenance of whom the state had appropriated for the succeeding two years \$131,250. The State Insane Asylum had at the same time 970 inmates, and the expenses for the period mentioned amounted to \$227,768. The inmates of the Reform School numbered 107; the expenditures were \$122,115.

The authorized strength of the Oregon National Guard is 2,166. The actual force is composed of one brigade, made up of three regiments of two battalions of four companies each, a separate infantry battalion of two companies, two troops of cavalry and a battery of artillery, the total force numbering 1,469, officers and enlisted men. The state annually appropriates \$30,000 for the Guard and the Federal government assists in the way of arms and munitions of war to the amount of from \$3,000 to \$5,000.

In 1896 there were newspapers published in all of the 32 counties of Oregon, the total number in the state being 198, of which 18 were daily, 9 semi-weekly, 149 weekly, 2 semimonthly and 20 monthly. The cities, towns and villages in which papers were published numbered 87, of which 30 were county seats.

Education. The public-school system of Oregon is on a firm financial basis. The annual interest on the irreducible school fund is nearly \$200,000. Besides this, amounts sufficient to maintain the free and normal schools and the State University are derived from taxation. In 1895 the value of the school property of the state was about \$3,000,000; the number of children of school age, 130,000; of teachers employed, 3,000; of schoolhouses, 2,000;

and the annual expenditures for school purposes approximated \$1,000,000. The state normal schools are free to all who desire to become teachers in the public schools of the state. The higher institutions of learning are given in the table below:

INSTITUTION.	LOCATION.	RELIGIOUS DENOMINATION.
Willamette Univ.	Salem	Methodist Episcopal.
Pacific Univ.	Forest Green	Nonsectarian.
McMinnville Coll.	McMinnville	Baptist.
Collegiate Inst.	Albany	Nonsectarian.
State University	Eugene City	Nonsectarian.
Corvallis Coll. (a)	Corvallis	Nonsectarian.
Portland Univ.	University Park	Methodist Episcopal.
Philomath College	Philomath	United Brethren.
Pacific College	Newberg	Friends.
LaFayette Sem.	LaFayette	Evangelical Assoc'n.

Communications. The railroad mileage of Oregon in 1895 reached 1,500 miles. Seven distinct lines are operated, giving the state abundant transportation facilities by land, while many of the rivers of the western portion are navigable for steamers at all seasons of the year. Boats ply on the Columbia and the Willamette rivers and on some of their tributaries. The United States government has expended more than \$2,000,000 in constructing locks at the Cascades, on the Columbia, 140 miles from the ocean, which, when completed, will allow uninterrupted navigation for 190 miles from the mouth of the river. The falls of the Willamette at Oregon City have had a canal with locks built around them by the state.

The following table of church statistics is taken from the census reports of 1890:

DENOMINATIONS.	ORGANIZATIONS.	MEETING-PLACES.	MEMBERS.	VALUE CHURCH PROPERTY.
Roman Catholic	95	95	30,231	\$290,090
Methodist Episcopal	203	201	9,436	614,625
Presbyt'r'ns in the United States of America	73	70	3,935	416,500
Disciples of Christ	74	42	4,067	76,700
Baptist	108	108	5,306	317,325
Methodist Episcopal S'th	70	62	1,936	50,850
United Brethren, Old Constitution	49	46	1,203	24,700
Protestant Episcopal	31	26	1,849	361,930
Congregational	35	38	2,037	160,200
Evangelical Association	25	24	1,199	63,900
Cumberland Presbyterian	23	21	897	22,200
Unitarian	5	5	890	139,500

The principal cities and towns of Oregon, with their population in 1890, are: Portland, 46,385; East Portland, 10,532; Astoria, 6,184; Albina, 5,129; Salem, 4,515; Albany, 3,079; Oregon City, 3,062; Baker, 2,604; Lagrande, 2,583; Pendleton, 2,506; Ashland, 1,784; Corvallis, 1,527; Roseburg, 1,472; Marshfield City, 1,461; Grant's Pass, 1,432; McMinnville, 1,368.

The following is a list of the governors of Oregon since the admission of the state into the Union: John Whiteaker, 1859-62; Addison C. Gibbs, 1862-66; George L. Woods, 1866-70; Lafayette Grover

(a) The State Agricultural College is a part of this foundation.

1870-77; S. F. Chadwick, 1877-78; W. W. Thayer, 1878-82; Zenas Ferry Moody, 1882-87; Sylvester Penoyer, 1887-95; William Paine Lord, 1895-.

See OREGON, Vol. XVII, pp. 822-825.

. OREGON, a village and the capital of Ogle County, north central Illinois, 85 miles W. of Chicago and 25 miles S. of Rockford, on the Chicago, Burlington and Quincy railroad. It has water-power and manufactures of flour, pianos and iron-castings, and is surrounded by a grain-raising district. Population 1890, 1,566.

OREGON CITY, a town and the capital of Clackamas County, northwestern Oregon, 15 miles S. of Portland, on the Willamette River, and on the Southern Pacific railroad; has extensive water-power, utilized for woolen, flour, wood-pulp and paper mills; is the center of a rich agricultural district. The United States land-office for the northern district of Oregon is here. Population 1890, 3,062; 1894, 5,635.

O'REILLY, JOHN BOYLE, an Irish-American author; born June 28, 1844, at Dowth Castle, County Meath, Ireland, which stands on the field where was fought the Battle of the Boyne. His father, William David O'Reilly, was for thirty-five years master of the Netterville Institution, Dowth Castle, and gave his son a good education. Young O'Reilly was apprenticed as a type-setter, and later became a reporter on various English



JOHN BOYLE O'REILLY.

journals as well as on some of the Dublin papers. He became a member of the Fenian Society in the latter city, and in 1863 joined the Tenth Hussars, the crack light cavalry regiment of the British army, his intention being to disseminate revolutionary sentiments among his fellow-soldiers. At the end of three years he was arrested for high treason, found guilty on five capital charges and sentenced to imprisonment for life; but afterward the sentence was changed to twenty years' penal servitude. He was transported in November, 1867, to the penal colony of West Australia in a convict-ship crowded with 340 criminals. In February, 1869, he obtained a small boat in which he put to sea, but was picked up nearly starved by a New Bedford whaler, which landed him at the Cape of Good Hope, from whence the young man made his way to America in November, 1869. He did odd jobs in New York; going thence to Boston, where he soon was employed on *The Pilot*, the leading Catholic organ of that region. In May, 1870, Mr. O'Reilly went to Canada as the correspondent of *The Pilot* with the second Fenian raid on that country, and, after the capture of O'Neill, was in command of the Irish forces for a time. He became editor and principal owner of *The Pilot*, retaining that connection during the remainder of his life. His principal works are *Songs of the Southern Seas* (1873); *Songs, Legends and Ballads* (1878); *Moondyne*, a novel (1879); *Statues in the*

Block (1881); *In Bohemia* (1886); and *Stories and Sketches* (1888). Many of his poems have a ring which appeals strongly to the sympathetic reader. Mr. O'Reilly died in Hull, Massachusetts, his summer residence, Aug. 10, 1890.

ORÉLIE, ANTOINE I, a French adventurer; King of Araucania and Patagonia, was the title assumed by Orélie Antoine Charles de Tounens; born in Chournac, in France, October, 1820. He studied law in Toulouse, practiced for a time in Perigueux, and about 1852 emigrated to Buenos Ayres. From there he went to Concepcion and Santiago as a merchant, where he traded with the Araucanians. Eventually he was adopted into one of their tribes and was chosen their king. Tounens issued a manifesto to the various nationalities of Europe and America, informing them of his accession to the throne. The Chilean government at once threatened to declare war against the Indians unless they agreed to expel the adventurous Frenchman. Orélie was taken prisoner, but escaped. Shortly afterward he was recaptured, and by the Santiago court of appeals declared a lunatic, placed on a vessel and sent to France. He lectured in the principal French cities, and in the autumn of 1869 returned to Patagonia. Here he failed to interest his alleged subjects in his behalf, and after a few months of adverse adventure sailed for Marseilles. All further attempts to regain his kingdom proved abortive, though he suffered much and showed much gallantry in their prosecution. In 1874 he returned to France, quite impoverished, and for a time became the inmate of a poorhouse in Bordeaux. Under the promise of great rewards, he found means to organize a new South American expedition, but before he could carry out his plans, died in Tourtoirac, France, Sept. 19, 1878.

O'RELL, MAX. See BLOUET, PAUL, in these Supplements.

ORELLANA, FRANCISCO DE, a Spanish soldier, one of the conquerors of Peru and the first explorer of the Amazon River; born in Truxillo, about 1490. He was one of Pizarro's lieutenants in the conquest of Peru, and was a member of the El Dorado expedition of 1539. He was sent ahead of this expedition with a brigantine to secure supplies, probably in April, 1541, and, on arriving at the junction of the Napo and Marañon, he continued on down the latter river. In the course of the voyage the Indians told him of a tribe of female warriors, or Amazons, and he claimed to have encountered them, from which story the Amazon River received its name. He reached the mouth of the Amazon late in 1541, and sailed therefrom, first to Trinidad and thence to Spain, where he received a grant to conquer the country discovered by him. He sailed on his return voyage to do so in 1544, but failed in his attempt, and retreated to Venezuela, where he died in 1546.

ORES. See MINING, Vol. XVI, pp. 462-466; and METALLURGY, Vol. XVI, pp. 57-63; see also articles on SILVER and GOLD, in these Supplements.

ORFA OR URFAH, same as EDESSA, Vol. VII, pp. 652, 653.

ORGANIC CHEMISTRY. See CHEMISTRY, in these Supplements.

ORGAN MOUNTAINS. See BRAZIL, Vol. IV, p. 223; also NEW MEXICO, Vol. XVII, p. 399.

ORGANOGENY. See EMBRYOLOGY, in these Supplements.

ORIBASIIUS OF PERGAMUS, an early Byzantine physician. See MEDICINE, Vol. XV, p. 804.

ORIEL. See *Bay Window*, under ARCHITECTURE, Vol. II, p. 460.

ORIENTAL RITE. See ROMAN CATHOLIC CHURCH, Vol. XX, pp. 630, 631.

ORIFLAMME, the battle-flag of France, adopted by Louis VI in 1124. See FLAG, Vol. IX, p. 279.

ORIGINAL-PACKAGE LEGISLATION. See LIQUOR LAWS, in these Supplements.

ORILLIA, a post village of Simcoe County, southern central Ontario, 86 miles N. of Toronto and about 25 miles N.E. of Barrie, the capital of the county, on Lake Couchiching near its junction with Lake Simcoe, and on the Grand Trunk railroad. It is situated in a district having large lumber and agricultural interests and producing large quantities of honey; has flour and saw mills, tanneries, foundries and carriage-shops, and is an important shipping-point for lumber and grain. It is popular as a summer resort, and is the seat of the Ontario Asylum for Idiots. Population 1891, 4,752.

ORKHAN, an early Turkish monarch. See TURKEY, Vol. XXIII, p. 641.

ORLANDO, a city and the capital of Orange County, central eastern Florida, 35 miles W. of Titusville and 90 miles S. of Palatka, on the Florida Central and Peninsular and the Savannah, Florida and Western railroads; cultivates oranges, pineapples and vegetables; has large foundry and machine works and two state banks. Is a noted winter-resort. Population 1890, 2,856.

ORLEANS, DUC D'. See PARIS, COMTE DE, in these Supplements.

ORLEANS, MAID OF. See JOAN OF ARC, Vol. XIII, p. 695.

ORMEROD, ELEANOR A., an English entomologist, the daughter of George Ormerod (1785-1873), the historian. She commenced her contributions to the science of entomology in 1868, in connection with the Bethnal Green Museum. In 1872 she represented Great Britain at the Moscow International Polytechnic Exhibition, and by her plaster models of plants and fruits, made by a process of her own, attracted general attention. She was elected a fellow of the Meteorological Society in 1878, the first woman elected to membership. She edited for the society the *Cobham Journals* (1880). In 1882 she was appointed consulting entomologist of the Royal Agricultural Society, and retained the post until 1892. She has held a number of honorary positions. Her principal publications are *Manual of Injurious Insects* (1881); *Guide to Insect Life* (1884); and

Reports of Observations on Injurious Farm Insects (1877-96).

ORODUS, a genus of cestraciont sharks whose remains are found in carboniferous strata. The fossils consist largely of immense teeth, indicating a fish of great size.

ORONO, a town of Penobscot County, central Maine, on the Penobscot River, eight miles N.E. of Bangor, and on the Maine Central railroad. It is engaged chiefly in the lumber business; has numerous manufactories of axes, barrels, matches, lumber, machinery, paper and pulp, and is the seat of the Maine State College (q.v., in these Supplements). Population 1890, 2,780.

ORONSAY. See COLONSAV, in these Supplements.

ORONTES, a river of Syria. See SYRIA, Vol. XXII, p. 821.

OROVILLE, a town and the capital of Butte County, northern central California, 28 miles N. of Marysville, and about 130 miles N.E. of San Francisco, on the Feather River, and on the Southern Pacific railroad. It is in a region producing oranges and other fruits, and has gold and silver mines in the vicinity. Population 1893, 1,787.

ORRERY, an astronomical machine constructed for the purpose of representing the motions, and, approximately, the relative magnitudes and distances, of the planets. George Graham, about the year 1700, invented what is regarded as the first machine for this purpose. An instrument-maker named of Rowley obtained possession of Graham's machine, reproduced it, and sent it to the Earl of Orrery (see CHARLES BOYLE, Vol. IV, p. 183), an amateur in mechanics. Sir Richard Steele, unacquainted with the name of the original inventor, called it in honor of the earl the *Orrery*, which name remained. A number of iron tubes, equal in number to the planets to be represented, of different dimensions, are arranged one within another. The innermost tube projects at each end beyond the one next to it, and that beyond the third, and so on. A rod is attached at right angles to one end of each tube. On the end of each of these rods there is a ball or lamp (to represent the planets). The lengths of these rods are also proportional, or supposedly so, to the radii of the orbits of the planets. The other ends of the tubes constitute axes for toothed wheels connected directly, or by combinations of other toothed wheels of the series, with a winch. The velocity of the revolutions of the rods, proportional to the times of the revolutions of the planets, is effected by a careful adjustment of the several combinations of wheels. On the top of the axis around which revolve the balls representing the planets when set in motion by turning the winch, is a large ball or lamp representing the sun, all the outer objects revolving around the central object at their proportional distances and velocities. The orrery superseded the planetarium constructed by Huyghens and Römer, which was popular in the seventeenth and eighteenth centuries, and was supplemented by the combined tellurian and lunarian, which showed the motion of

the moon around the earth, of the earth around the sun, with the several phenomena accompanying the progress of each. These devices are now regarded as toys and of no scientific value.

ORRVILLE, a village of Wayne County, northeastern central Ohio, 54 miles S. of Cleveland and 14 miles W.N.W. of Massillon, on the Pittsburg, Fort Wayne and Chicago, the Cleveland, Akron and Columbus and the Wheeling and Lake Erie railways. It is the shipping-point for an agricultural and stock-raising district, and has manufactories of organs, furniture, plows and threshing-machines. Population 1890, 1,765.

ORSINI, a Roman faction. See ROME, Vol. XX, pp. 796-806

ORSOVA, the name of two towns on the Danube, equidistant between the Iron Gates. OLD ORSOVA, a Hungarian place, is 478 miles S.E. of Vienna, and a short distance above the point where the river leaves the Hungarian territory. Population, 1,200.—NEW ORSOVA, on the Servian side, is situated on an island 3 miles below the former and 36 miles E. of Moldova. It is a fortified place, and a station for steam packets on the Danube. Population, 3,200.

ORTA, a town and small lake in the province of Novara, compartment of Piedmont, northwestern Italy, about 25 miles N.N.W. of Novara. The town is situated on a peninsula upon the east shore of Lake Orta, a small body of water having an elevation of 950 feet and draining through the Toce into Lake Maggiore. Population, about one thousand.

ORTEGAL, CAPE, the most northerly point of land in Spain, in the province of Corunna, about 35 miles N.E. of the city of Corunna, extending into the Bay of Biscay.

ORTHAGORISCIDÆ. See SUN-FISH, Vol. XXII, pp. 658, 659; also OPAH, Vol. XVII, p. 777.

ORTHODOX. See QUAKERS, Vol. XX, p. 149; and FRIENDS, SOCIETY OF, in these Supplements.

ORTHOPÆDIC SURGERY, treatment of *Deformities*, q.v., under SURGERY, Vol. XXII, pp. 691, 692.

ORTHOPTERA. See INSECTS, Vol. XIII, pp. 152, 153.

ORTON, ARTHUR, an English impostor. See TICHBORNE, in these Supplements.

ORTON, EDWARD, an American geologist; born in Deposit, New York, March 9, 1829; graduated at Hamilton College, 1848; studied at Lawrence Scientific School of Harvard; professor of sciences at the New York State Normal School, Albany, from 1856 to 1859; professor of natural history at Antioch College, 1865; president of Antioch, 1872; president of the Ohio State University, 1873; resigned the last position in 1881, but retained his professorship of geology. He was appointed assistant state geologist for Ohio, 1869; state geologist, 1881; president of the Ohio State Sanitary Association, 1884; vice-president in the section of geology of the American Association for the Advancement of Science,

1885. He paid special attention to the distribution of petroleum, coal, natural gas and asphalt, contributing many papers on these subjects to the state and other geological reports. He partly prepared the *Geology of Ohio* (1872-75); published *Economic Geology of Ohio* (1883-88), and *Petroleum and Inflammable Gas* (1887); and contributed the article on OHIO to this ENCYCLOPÆDIA.

ORTON, JAMES, an American naturalist; born in Seneca Falls, N. Y., April 21, 1830; graduated at Williams College in 1855, and at Andover Theological Seminary in 1858; spent some time in travel in Europe and the East; became a Congregational minister in 1860; was appointed instructor in natural science in the University of Rochester in 1866, and in 1869 was called to the chair of natural history at Vassar College, which he held until his death. He was at the head of the expedition (1867-68) under the auspices of Williams College which crossed the Andes of Ecuador, descending the Napo and the Amazon, collecting the first fossils discovered in that region; and made another visit in 1873, ascending the Amazon, and died during the passage of Lake Titicaca, Peru, Sept. 25, 1877. He published *Miners' Guide and Metallurgists' Directory* (1849); *The Proverbialist and the Poet* (1852); *The Andes and the Amazon* (1870); *Underground Treasures: How and Where to Find Them* (1872); *Liberal Education of Women* (1873); and *Comparative Zoology, Structural and Systematic* (1877, 1883).

ORTONA, a town of eastern Italy, on the Adriatic Sea, and on the Western Adriatic railroad, 104 miles S.E. of Ancona and 12 miles E. of Chieti, in the compartment of Abruzzo and Molise. It has a cathedral and a recently improved harbor, and has a considerable trade in wine. Population 1881, 6,894.

ORTONVILLE, a city and the capital of Big Stone County, western Minnesota, at the southeastern extremity of Big Stone Lake, on the Chicago, Milwaukee and St. Paul railroad, 45 miles N.W. of Montevideo. It is situated in a fertile prairie country, producing wheat and live-stock. In the vicinity there are extensive granite quarries. Population 1890, 768; 1895, 1,180.

ORTYGIA, an island. See SYRACUSE, Vol. XXII, pp. 813, 814.

OSAGE, a city and the capital of Mitchell County, northern Iowa, near Red Cedar River, 17 miles N.N.W. of Charles City, on the Illinois Central and the Winona and Western railroads. It contains an academy, flour-mills, a foundry, and manufactories of mowers, reapers and wagons. Population 1890, 1,913; 1895, 2,509.

OSAGE, a tribe of North American Indians who occupy a reservation of 1,500,000 acres in the northeastern portion of Indian Territory. They numbered in 1895 1,657, of whom 758 were half-breeds. For tribal relations and descent, see INDIANS, Vol. XII, pp. 828, 832.

OSAGE CITY, a city of Osage County, eastern central Kansas, about 30 miles S.S.W. of Topeka, on the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads; extensively engaged in

coal-mining and flagstone-quarrying. It has rich beds of yellow ocher and contains manufactories of bricks and pottery. Population 1890, 3,469; 1895, 4,273.

OSAGE MISSION, a village of southeastern Kansas, on the Neosho River, 35 miles S.W. of Fort Scott and about 15 miles W. of Girard, on the Missouri, Kansas and Texas railroad. Its postoffice designation is St. Paul. It is the seat of St. Ann's Academy for girls and St. Francis Institute for boys; is extensively engaged in the shipping of grain, and has flour-mills and plow-works. Population 1890, 1,097; 1895, 1,057.

OSAGE ORANGE (*Maclura aurantiaca*), a tree of the family *Urticaceae*, a native of North America. It attains a height varying from twenty to sixty feet. The wood, which is bright yellow, is fine-grained and very elastic, and takes a high polish. The tree is largely employed in America, especially in the West, as a hedge-plant. Its fruit is about the size of a very large orange, has a tuberculated surface, and is filled internally with radiating, somewhat woody fibers, and with a yellow, milky juice, whose odor is generally disliked, so that the fruit, although not unwholesome, is seldom eaten.

OSAWATOMIE, a city of Miami County, eastern Kansas, on the Marais des Cygnes River, and on the Missouri Pacific railroad, seven miles S.W. of Paola and about fifty miles S.E. of Topeka. It is situated in a region producing grain, vegetables, butter and live-stock; has good coal in the vicinity, and contains manufactories of flour and lumber. One of the state insane asylums is located here. Population 1890, 2,662; 1895, 2,612.

OSBORNE, a city and the capital of Osborne County, northwestern central Kansas, 34 miles W. of Beloit and about fifty miles N.E. of Hays City, on the South Fork of Solomon River, and on the Missouri Pacific railroad. It is situated in a rolling prairie country, producing grain, vegetables, broom-corn, sorghum, butter, wool, hay and live-stock. Population 1890, 1,174; 1895, 991.

OSCAN, a Latin dialect. See ROMANCE LANGUAGES, Vol. XX, p. 661.

OSCAR I. See SWEDEN, Vol. XXII, p. 752.

OSCAR II, **FREDERIC**, King of Sweden and Norway; born in Stockholm, Jan. 21, 1829. After

his education and foreign travels were completed, he succeeded to the throne on the death of his brother, Charles XV, Sept. 18, 1872. He reorganized the army and the railroads. In 1873 he visited Norwegian Lapland, and in 1875 the emperors of Germany and Russia. King Oscar published translations of Goethe's *Faust* and of



OSCAR II.

Tasso, a sketch of Charles XII, and a volume of poems, published under the pseudonym of "Oscar

Frederik." His collected writings appeared in four volumes, 1875-91; and a fifth volume, containing his speeches, appeared in 1894.

OSCEOLA, a city and the capital of Clark County, southern Iowa, about 45 miles S.S.W. of Des Moines, near the Chariton River, on the Chicago, Burlington and Quincy and the Des Moines and Kansas City railroads. The surrounding region is devoted to agriculture and stock-raising. The city contains a normal school and a high-school, a sanitarium, an electric-light plant, and manufactories of flour, woolens, lumber, marble, and agricultural implements. The machine-shops of the Des Moines and Kansas City railroad are located here. Population 1890, 2,120; 1895, 2,176.

OSCEOLA, a post village and the capital of St. Clair County, western Missouri, on the right bank of the navigable Osage River, and on the Kansas City, Fort Scott and Memphis and the Kansas City, Osceola and Southern railroads, about 60 miles S.S.W. of Sedalia and about 85 miles S.E. of Kansas City. It is an important shipping-point for a district producing grain and live-stock, and large stone-quarries are in the vicinity. Population 1890, 995.

OSCEOLA, a post village and the capital of Polk County, eastern central Nebraska, about 100 miles W.S.W. of Omaha and about 56 miles N.W. of Lincoln, on the Union Pacific railroad. It is situated in a level prairie region, producing wheat, corn, oats, hay and live-stock. Population 1890, 947.

OSCEOLA (*As-se-he-ho-lar*, "Black Drink"), a Seminole chief; born in Georgia, in 1804. He was a son of an English trader named Powell and of a chief's daughter. With her he removed to Florida while a child, and there attained great influence among the Indians. In 1835 his wife, the daughter of a runaway slave, was seized as a slave. The outraged husband threatened revenge, and for his threats was imprisoned six days in irons by General Thompson; six months afterward he killed the general and four others outside Fort King. This was the beginning of the second Seminole War. He then placed himself at the head of a band which had surprised and massacred Major Dade and a detachment of soldiers, and, taking to the almost impenetrable everglades with two or three hundred followers, fought for nearly two years with great energy and skill the superior numbers sent against him. He was taken prisoner at last, in October, 1837, by General Jesup, while holding a conference under a flag of truce, and confined in Fort Moultrie until his death, Jan. 30, 1838.

OSCEOLA MILLS, a borough of Clearfield County, western central Pennsylvania, on Mushannon Creek, and on the Pennsylvania railroad and the Altoona and Phillipsburg connecting line, about 30 miles N. of Altoona and 21 miles S. of Clearfield. It is situated in a region producing coal, of which large quantities are shipped, iron-ore and fire-clay; and contains foundries, a tannery, lumber-mills and a machine-shop. In

1875 the greater part of Osceola was destroyed by fire, about two hundred and fifty buildings being consumed. Population 1890, 1,730.

OSCILLATOR, NIKOLA TESLA'S. The oscillating engine of Nikola Tesla occupies a position midway between the steam-engine and the electric dynamo. It is virtually a steam-chest set upright and disassociated from the usual mechanism that accompanies it in the steam-engine, but arranged to carry reciprocating armatures on its pistons. The steam-chest is run at a very high pressure, 350 pounds to the square inch, and no packing is used, the inventor having devised a means of operating without it. Opposite the steam-chest is an electro-magnetic coil, into whose field of force the piston is alternately thrust and withdrawn, thus setting up electric currents, as in an engine-driven dynamo. This is the form that was exhibited at the Columbian Exposition in Chicago, but Mr. Tesla built some six or eight other experimental forms previous to the destruction of his New York laboratory by fire in 1895. The latest and best of these was a double machine, made horizontal, and arranged all on one base-plate. The steam-chest is single, but has two pistons, which reciprocate oppositely at a speed of eighty to one hundred times a second. The armatures on the pistons are plunged at every stroke into the fields of the two electro-magnetic generating systems, which constitute the dynamos of the machine. On top of the steam-chest, which is located centrally between the dynamos, is a miniature oscillator, arranged to serve as a governor, by controlling the admission of steam, and making the vibration of the engine independent of its load.

The advantages of the oscillator, as compared with a direct-connected steam-engine and dynamo, are a reduction in friction, consequent on the material reduction in the number of parts; a reduction in wear, due to few parts, and the absence of crank-motion; also the ease and simplicity with which it is regulated and maintained at an even speed. It accomplishes the end of converting the pressure of steam into electric energy in a much more direct manner than was before possible, and for this reason, and because of the eminent character of the inventor, engineers expect a great future for the oscillator. Its practical work, however, at this date has been confined to electric lighting, and that of a rather experimental character. It is primarily designed for use in electric-lighting plants, though it has a future of promise in steamboat navigation and railway locomotion. C. H. COCHRANE.

OSCILLATORY DISCHARGE. See **ELECTRICITY**, § 92, in these Supplements.

OSCINES, a suborder of *Passeres*, including the birds with highly developed singing apparatus. Morphologists consider them the highest birds. The group includes the great majority of the passerine birds. The term is opposed to *Clamatores* (q. v., in these Supplements). See **ORNITHOLOGY**, Vol. XVIII, p. 47.

OSCODA, a village of Iosco County, in the

northeastern part of the southern peninsula of Michigan, 70 miles N. of Bay City, on Lake Huron, at the mouth of Au Sable River, and on the Au Sable and Northwestern and the Detroit and Mackinac railroads, close to Au Sable village. It is surrounded by heavy pine forests; has a large trade in lumber, and contains saw and planing mills, a foundry and extensive salt-works, said to be the largest in the state. Population 1890, 3,593; 1894, 2,078.

OSCOTT, a Roman Catholic college, in the village of that name in the parish of Handsworth, Staffordshire, four miles N. of Birmingham, England. The name is first met with toward the close of the seventeenth century as the seat of a Catholic mission, which continued to be served by different priests till, in 1752, it was formed into a college for the education of both laymen and ecclesiastics, and called St. Mary's College. In 1835 the present buildings were erected from the designs of Pugin, at a cost of \$300,000. The buildings are arranged in the form of a cross. In 1889 the establishment became purely ecclesiastical, no longer admitting lay students. The curriculum includes classics, science and mathematics for the purpose of preparing students for the B.A. examination of the University of London. Subsequently the course includes mental philosophy (two years) and theology (three and a half years). The college is presided over by a rector, has a vice-rector and a staff of eight professors, and is open to students from any British diocese.

OSCULATING CURVES. See **INFINITESIMAL CALCULUS**, Vol. XIII, pp. 26, 27.

OSCULATING PLANE. See **MECHANICS**, Vol. XV, p. 679.

OSGOOD, FRANCES SARGENT, an American poetess, daughter of Joseph Locke, a merchant; born in Boston, Massachusetts, June 18, 1811. In 1835 she married S. S. Osgood, a portrait-painter; resided in England from 1836 to 1840, and while there published *The Casket of Fate* and *A Wreath of Wild Flowers from New England* (1838). Returning to Boston in 1840, she soon afterward removed to New York, and subsequently published *The Language of Gems; Poetry of Flowers, and Flowers of Poetry* (1841); *The Interpretations of Flora; The Snow Drop* (1841); *Cries of New York; The Flower Alphabet; Poems* (1846); *The Floral Offering* (1848). A complete edition of her poems was published in 1850. She died in Hingham, Massachusetts, May 12, 1850.

OSHAWA, a town and port of entry of Ontario County, southern central Ontario, Canada, on Lake Ontario, 33 miles N.E. of Toronto, and on the Grand Trunk railroad. It is a shipping-point and important market town, and has manufactories of steam-engines, printing-presses, mill machinery, agricultural implements, musical instruments, furniture, boots and shoes, etc. There are also large flour-mills. Population 1891, 4,066.

O'SHEA-PARNELL SCANDAL. See **HOME RULE**, in these Supplements.

OSHKOSH, a city of Wisconsin. In 1890 there were three railroads entering the city: the Chicago and North-Western, the Chicago, Milwaukee and St. Paul and the Wisconsin Central. The census returns for the above year showed a total in the city of 423 manufacturing establishments, representing 71 industries, with a combined capital of \$6,531,213, employing 5,397 persons, to whom was paid \$2,017,267 in wages, and turning out products valued at \$8,619,219. The principal industries are flour, saw and planing mills, coffin and furniture factories, machine-shops, foundries, match factories, vinegar-works, breweries, slaughtering and meat-packing.

Oshkosh is the seat of the Northern Wisconsin Insane Asylum, has a United States government building, two libraries, a fine public-school system, is lighted by gas and electricity, and furnished with water by the Holly system of water-works.

The banks of the city, state and national, had in 1890 a combined capital of \$850,000, and in 1894 the assessed valuation of property in Oshkosh was \$8,580,497.

The city has a large shipping trade by lake and river, the principal articles of shipment being flour and lumber, and within recent years has become popular as a summer-resort. Population 1890, 22,836. See **OSHKOSH**, Vol. XVIII, p. 55.

OSIRIS. An Egyptian divinity. See **EGYPT**, Vol. VII, pp 714-717.

OSKALOOSA, a city of Iowa. It had in 1890 three railroads: the Chicago, Burlington and Quincy, the Iowa Central and the Chicago, Rock Island and Pacific. The coal-mines in the vicinity are very extensive, and employ about three thousand hands. Other industries include bridge-building and steam-heater works, brick, tile and ironworks, glove and washing-machine factories. The city has gas and electric lights, street railroads, water-works, four libraries containing over 11,000 volumes, a good public-school system, several banks, and newspapers, daily and weekly. It is the seat of Oskaloosa College (Christian), a co-educational institution established in 1862, which in 1895-96 had 10 instructors, 117 students, and a library of 4,000 volumes. Penn College (Friends), also located here, is a co-educational institution founded in 1873. In 1895-96 it had 11 instructors, 270 students, and a library of 4,000 volumes. Population 1890, 6,558; 1895, 8,551. See **OSKALOOSA**, Vol. XVIII, p. 55.

OSKALOOSA, a city and the capital of Jefferson County, northeastern Kansas, 25 miles N.E. of Topeka, and about 20 miles W.S.W. of Leavenworth, on the Kansas City Northwestern and the Leavenworth, Topeka and Southwestern railroads. It is in a grain, stock and fruit-raising district, and has saw and grist-mills, creamery and canning factory. Population 1890, 773; 1895, 869.

OSMAN, **NUBAR PASHA**, a Turkish general; born in Tokat, in Asia Minor, in 1832. After his military education at Constantinople was finished,

he entered the cavalry in 1854 and served under Omar Pasha. He took part in the suppression of the rebellions in Syria, 1860; in Crete, 1867; and the Yemca, 1874. In 1876 he was commandant at Widdin during the Turko-Servian War, and for his valorous conduct at Saitschar was promoted from general to field-marshal. After the Russians had crossed the Danube in 1877, Osman Pasha repulsed their ninth corps with terrible slaughter at Plevna, July 24 and 31, and then thoroughly fortified that city. On September 14 he repulsed the Russian besiegers, with a loss of 2,000 men. The Sultan bestowed on him, October, 1877, the title of "Ghazi" (Victorious). On December 10 he made a gallant but unsuccessful attempt to break through the Russian lines. Being wounded, he was compelled to capitulate, surrendering 40,000 men and 400 cannon. His sword was returned to him by the Czar, and he was treated with the greatest courtesy by his conquerors. His skillful conduct of the siege had given him fame as an engineer and commander. After the war the reorganization of the Turkish army was intrusted to him. In 1878 he became commander-in-chief of the Imperial Guard, governor-general of Crete, and Minister of War. In 1882 he received the title of Seraskier, and in 1894 became Grand Marshal of the Palace.

OSMAN ALI, commonly called **OSMAN DIGNA**, the leader of the Soudanese dervishes, was born at Suakim about 1836, his grandfather being a Turkish slave-dealer, who married a woman of the Hadendowa tribe. Osman followed the trade of his grandfather and father, dealt in slaves, having agents at Khartoum and Berber, the latter place latterly being his headquarters. He entered into communication with the Mahdi, Mohammed Ahmed, and brought the various tribes into a union for the purpose of raising the standard of revolt against the Khedive. He became the military head of the dervishes. The rebellion of "the false prophet" broke out on the White Nile in December, 1881. On Aug. 3, 1883, Osman was defeated before Suakim by Tewfik Bey. Again in September, 1885, an Abyssinian expedition under Ras Alula, which had been sent to the relief of Kassala, met Osman and utterly routed him. On Dec. 21, 1888, he was overcome at Suakim by Gen. Sir F. Grenfell; on Feb. 21, 1891, he was defeated and fled precipitately without having taken a direct or personal part in the fight, at Handoub. On March 7 the sheiks assembled at Suakim to hear the amnesty proclamation of the Khedive read by General Grenfell. In 1893 Osman Digna moved his headquarters to Amet, about 80 miles S.E. of Suakim. In April, 1894, he made another incursion towards Tokar, but was driven off by the Egyptian cavalry. For the operations against the dervishes in 1896, see **EGYPT**, in these Supplements.

OSMIUM. See **CHEMISTRY**, Vol. V, pp. 536, 537.

OSMOSE, the inter-diffusion of two liquids through a septum, usually of bladder or of parchment-paper. If a bottle, filled with one liquid, be

closed by parchment-paper, and be completely immersed in a vessel containing another liquid, increase or decrease of the contents of the bottle will occur according as the liquid contained in the bottle passes out through the septum less quickly or more quickly than the other liquor passes inward. When the contents are increased the phenomenon has been called *endosmose*, when they decrease it has been termed *exosmose*. The distinction is obviously not a scientific one; for a reversal of the position of the liquid will cause a reversal of the osmotic process, so that the process which was formerly denominated *exosmose* must now be called *endosmose*, and *vice versa*. The phenomenon is one of extreme importance, for it is constantly taking place in living bodies—both animal and vegetable.

OSMOSIS. See **CHEMISTRY**, in these Supplements.

OSMOTIC PRESSURE. See **CHEMISTRY**, in these Supplements.

OSMUNDACÆ. See **FERNS**, Vol. IX, p. 104.

OSSEIN. See **PHOSPHORUS**, Vol. XVIII, p. 815.

OSSETES, tribes of **CAUCASUS**, Vol. V, pp. 257, 258.

OSSETES, LANGUAGE OF. See **PERSIA**, Vol. XVIII, p. 655.

OSSIPEE, a town and the capital of Carroll County, eastern New Hampshire, in Ossipee township, on the Boston and Maine railroad, about 40 miles N.E. of Concord. It is situated in a mountainous district covered with heavy forests, whence its sawmills are supplied with logs. The manufacture of lumber is the most considerable industry. The township has a number of villages, and on its northern boundary is Ossipee Lake, much frequented during the summer months by health-seekers and tourists. Pop. 1890, 1,630.

OSTEOBLASTS. See **ANATOMY**, Vol. I, pp. 855, 856.

OSTEOGLOSSIDÆ, a family of *Physostomi*. See **ICHTHYOLOGY**, Vol. XII, p. 693.

OSTEOLEPIS, a genus of fossil ganoid fish peculiar to the Old Red Sandstone. It is characterized by smooth rhomboidal scales, by numerous sharply pointed teeth, and by having the two dorsal and anal fins alternating with each other. The body is long and slender.

OSTEOLOGY. See **ANATOMY**, Vol. I, p. 820.

OSTERODE, a town of Hanover, western Prussia, at the western base of the Harz Mountains, 30 miles N.W. of Nordhausen and 18 miles N.E. of Göttingen. Its church of St. Giles contains the graves of the dukes of Grubenhagen, and there are also a fine town-hall, baths, large grain-stores, and cotton, woolen and linen factories. Population, 6,705.

OSTHOFF, **HERMANN**, a German philologist; born in Billmerich, Westphalia, April 18, 1847; left the gymnasium of Una to enter the University of Bonn; continued his studies at Tübingen and Berlin; became teacher in the gymnasium of Casel (1871-74); privat docent in Leipzig (1875-77); professor of comparative philology in the Uni-

versity of Heidelberg (1877). He was one of the foremost students of Indo-European grammar and philology, etc. Among his better-known works are *Forschungen im Gebiete der Indogermanischen Nominalen Stammbildung* (1875-76); *Das Verbum in der Nominalcomposition* (1878); *Morphologische Untersuchungen* (1878-90); *Zur Geschichte des Perfects im Indogermanischen* (1884).

OSTRACODA, an order of **CRUSTACEA**, Vol. VI, p. 664.

OSTREA. See **OYSTER**, Vol. XVIII, p. 106.

OSTROG, a town in the province of Volhynia, southwestern Russia, about 170 miles W. of Kiev. It consists of an old and new town, and has an ancient castle. In the reign of Constantine of Ostrog the first Slavonic Bible was printed here, in 1558. At the present day Ostrog is the seat of a military school, and has a trade in wheat, wool, leather and wood. The population, made up principally of Jews, was, in 1885, 16,522.

OSTROLENKA, a town in the government of Lomza, Russian Poland, 22 miles W.S.W. of Lomza, on the Narew River, and on the high-road from Kovno to Warsaw, in a woody and sandy neighborhood. It is noted as the scene of two battles: the first, Feb. 16, 1807, between the French and Russians, in which the latter were defeated; the second occurred May 21, 1831, between the Poles under Skrzynecki and the Russians under Diebitsch. After a long and desperate struggle the Poles were forced to retreat, but the Russians were so weakened that they were unable to continue in pursuit. Population 1895, 5,865.

OSTROWSKI, the name of a family of Polish nobles, derived from the old palatinate of Lublin. **COUNT TOMASZ ADAM RAWICH OSTROWSKI**; born in Ostrow in Lomza, Dec. 21, 1739; supported the establishment of the constitution of May 2, 1791; appointed Minister of Finance by Stanislaus II (King of Poland, 1764-95); resigned after the confederation of Targowicz (May, 1792), by the Polish nobles to overthrow the constitution of 1791. After the third partition of Poland, in 1795, he retired to his castle in the Ukraine. On the establishment of the Duchy of Warsaw, as a result of Napoleon's influence, as seen in the treaty of Tilsit (1807), he became in 1809 grand marshal of the diet, and president of the Senate 1811. By the constitution of 1815 the Duchy of Warsaw became the Russian kingdom of Poland, the Czar, Alexander I, intrusting the promulgation of the constitution to Ostrowski. He died Feb. 5, 1817.—His son, **COUNT ANTONI JOANNES OSTROWSKI**; born in Warsaw, May 27, 1782; entered the French body guard in 1806; became a member of the provisional government of the Duchy of Warsaw; was with Napoleon at Dresden and at the battle of Leipsic; became Senator at Warsaw on the death of his father; opposed the Grand Duke Constantine, who was obliged to quit Warsaw in 1830; was a leader in the revolution of that year; fought in the ranks on the walls of his native city when it surrendered, on Sept. 8, 1831; wrote the manifesto which was issued to the rulers of Eu-

rope by the Polish army Oct. 4, 1831. He went to Paris; published *Le Panslavisme Moscovite* (1842), and died in Tours in 1846.

OSWALD, FELIX LEOPOLD, an American traveler and author; born in Namur, Belgium, in 1845; graduated at Liege in 1864; educated as a physician, but became attracted to natural history; removed to the United States, settling in Tennessee, and traveled in Mexico. His publications include *Summer-Land Sketches: or, Rambles in the Backwoods of Mexico and Central America* (1880); *Physical Education* (1882); *The Secret of the East: or, The Origin of the Christian Religion* (1883); *Zoological Sketches* (1883); *Household Remedies* (1886); *Days and Nights in the Tropics* (1887); *The Poison Problem* (1887); *The Bible of Nature* (1888); *The Dragon of the North* (1888).

OSWEGATCHIE RIVER, an affluent of the St. Lawrence; rises in Herkimer County, New York, flows northeasterly, and expands into Cranberry Lake, in St. Lawrence County, then flows westerly to Oxbow, Jefferson County, where it turns abruptly northeast, and after following this direction for some distance turns northwest and joins the St. Lawrence near Ogdensburgh. It is 130 miles long.

OSWEGO, a city and the capital of Labette County, southeastern Kansas, on the Neosho River, 10 miles N. of Chetopa and 15 miles S.S.E. of Parsons, and on the Missouri, Kansas and Texas and the St. Louis and San Francisco railroads. It is in a region producing fruit, grain and live-stock; has an excellent water-power and a number of mills and factories. Population 1890, 2,574; 1895, 2,145.

OSWEGO, a city and port of entry of New York. Population 1890, 21,842. See OSWEGO, Vol. XVIII, p. 64.

OSWEGO FALLS, a village of Oswego County, northern central New York, on the west bank of the Oswego River and canal, opposite Fulton, with which it is connected by two iron bridges, and on the Delaware, Lackawanna and Western railroad, 24 miles N.W. of Syracuse. It contains lumber, woolen, paper and pulp mills. Population 1890, 1,821.

OSYMANDYAS, an ancient Egyptian king, thought to be identical with Rameses I. See LIBRARIES, Vol. XIV, p. 510.

OTAGO, the most southern provincial district of New Zealand, in the South Island, colonized in 1848 by the Otago Association, connected with the Free Church of Scotland. It is bounded on the north by Canterbury and Westland, and on the east and west by the sea. It has a coast-line of 400 miles, and is 160 miles long by 195 broad. The eastern and central portions of the province have considerable pasture and arable land, while the western part is mountainous, belonging to the region of the New Zealand Alps, and contains a variety of minerals. Gold was discovered here in 1861, and now the gold-fields comprise an area of 2,500,000 acres, from which gold to the value of \$90,000,000 had been exported up to 1888. Dunedin is the capital. Population 1891, 153,097.

OTARIIDÆ, a family of *Pinnipedia*. See MAMMALIA, Vol. XV, pp. 442, 443.

OTCHAKOFF, a seaport city of southwestern Russia, on the north shore of the estuary of the Dnieper, 38 miles N.E. of Odessa. It occupies the site of the ancient *Alector*, and has beside it the ruins of the once important Greek colony of Olbia. In 1492 the Khan of the Crimea built here a strong fortress, which was taken by the Russians under Münnich in 1737, recovered in 1738, and again captured after a long siege by Potemkin in 1788, and definitively annexed by Russia. After it had been bombarded by the allied fleet in 1855, the Russians demolished the fortifications. In 1887 a ship canal was opened here, which makes the estuary of the Bug and Dnieper much more easily accessible to large ships. The population, mostly Jews, engaged in the fishing-trade, was, in 1891, 5,227.

OTHMAN. See OSMAN, Vol. XVIII, p. 55.

OTHOLOGONAL STRAINS. See STRENGTH OF MATERIALS, in these Supplements.

OTHO OF BAVARIA, King of GREECE. See Vol. XI, pp. 125, 126.

OTOMIS or OTHOMIS, a tribe of Mexican Indians. See INDIANS, Vol. XII, p. 828.

OTRANTO. See FOUCHÉ, Vol. IX, p. 476.

OTSEGO, a village of Allegan County, in the southern part of the southern peninsula of Michigan, on the Kalamazoo River, and on the Lake Shore and Michigan Southern railroad, 10 miles S.E. of Allegan and 43 miles S. of Grand Rapids. It is situated in the celebrated fruit-growing region of Michigan; has good water-power, paper-mills, iron-works, corn-cutter, chair and sash factories and lumber and saw-mills. There are magnetic springs in the vicinity. Population 1890, 1,626; 1894, 1,851.

OTTAWA, one of the largest rivers of British North America. It rises nearly 300 miles due N. of Ottawa City, in lat. 48° 30' N., long. 76° W., in the watershed on the opposite side of which the St. Maurice and Saguenay take their rise, flows west to Lake Temiscamingue, some 300 miles, and thence 400 miles southeast, and falls into the St. Lawrence by two mouths, which form the island of Montreal. Its drainage basin has an area variously estimated at from 60,000 to 80,000 square miles, and contributes to the St. Lawrence, of which it is the largest tributary, a volume of 90,000 cubic feet per second. During its course it sometimes contracts to forty or fifty yards; elsewhere it widens into numerous lakes of considerable size. It is fed by many important tributaries, including the Gatineau, Lièvre and Rouge. These with the Ottawa itself give transit for what is probably the largest lumber trade in the world. The course of the Ottawa is marked by falls and rapids, the best known being the Carillan Falls, a series 12 miles in length above Rigaud; near the city of Ottawa the Chaudière Falls; and 30 miles farther up the river Les Chots, a grand and striking series of rapids. The river is connected with Lake Ontario by a canal from Rideau to Kingston.

OTTAWA, a city of Canada, the capital of the Dominion and of Carleton County. According to the returns for 1892 the customs receipts for the city were \$367,629, the imports \$3,741,201 and the exports \$1,942,051; and the assessed valuation for

the city, in 1893, \$18,616,985. The sawed-lumber trade has increased to a great extent, the capacity of mills within the city being about two hundred million feet for the season. The chartered branch banks of the city have a combined capital of over thirty-eight million. In 1895 there were six daily, three semiweekly, four weekly, one semimonthly and four monthly newspapers. Population 1891, 44,154. See also OTTAWA, Vol. XVIII, p. 68.

OTTAWA, a city and capital of Lasalle county, northeastern central Illinois, on the Illinois River, at the mouth of the Fox River, on the Illinois and Michigan canal, and on the Chicago, Burlington and Quincy, and Chicago, Rock Island and Pacific railroads. The city has a large number of structures of architectural excellence. These embrace a county court-house, high-school building, the Reddick Library, churches, two national banks and other public and private edifices. Besides a fine system of public schools, the city is the seat of St. Francis Xavier Academy. Its manufacturing plants include cutlery, tile and glass works, flouring and planing mills, starch, glass, agricultural-implement and other industries of a valuable and substantial character. The city is lighted by gas and electric lights, has an electric street-railway, supports three daily and eight weekly papers and has an abundant water-supply from artesian wells and other sources. Population 1890, 9,985. See also OTTAWA, Vol. XVIII, p. 69.

OTTAWA, a city and the capital of Franklin County, eastern Kansas, on the Marais des Cygnes River, at the junction of the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads, 53 miles S.W. of Kansas City and 27 miles S. of Lawrence. It is the trade-center of a region with rich agricultural interests and abounding in coal and timber, and has railroad machine-shops, manufactures of flour, sorghum, furniture, iron, castor oil, soap, etc., and is the seat of Ottawa University (Baptist), co-educational, established in 1860, and having in 1895, 15 instructors, 402 students and a library of 3,000 volumes. Population 1890, 6,248; 1895, 7,059.

OTTAWA, a village and the capital of Putnam County, northwestern central Ohio, on the Blanchard River, a tributary of the Auglaize, 20 miles N. of Lima, and on the Cincinnati, Hamilton and Dayton and the Findlay, Fort Wayne and Western railroads. It has manufactories of spokes, hubs, sash and blinds, and is the center of a grazing and agricultural district producing corn and small grains, potatoes, butter, wool, hay, maple sugar, sorghum, pork and live-stock. Population 1890, 1,717.

OTTAWA INDIANS. See INDIANS, Vol. XII, p. 832.

OTTENDORFER, OSWALD, an American journalist and philanthropist; born in Zwittau, in Moravia, Feb. 26, 1826; attended law courses in Prague and Vienna; came to the United States in 1871, settling in New York; was editor of the *New-Yorker Staats-Zeitung*; became proprietor of the journal, which he made an influential organ of the Democratic party; elected president of the German Reform Association; in 1872-74 was an alderman; and in 1874 a candidate for mayor. He gave \$300,000

to found an educational institution in Zwittau; founded a home for the aged and indigent men; and established the Ottendorfer Library in New York City at a cost of \$50,000. He then retired from active business and went abroad.

OTTERBEIN, PHILIP WILLIAM, a German clergyman, founder of the Church of the United Brethren (q.v., in these Supplements) in the United States; born in Dillenburg, Nassau, June 3, 1726; educated at the German Reformed Academy at Herborn; ordained in the German Reformed Church at Dillenburg in 1749; sent as a missionary to the United States in 1752; labored in Pennsylvania and Maryland; introduced new methods and new measures; met Rev. Martin Boehm about 1766; formally organized the Church of the United Brethren in Christ, Boehm and Otterbein being chosen bishops. He died in Baltimore, Nov. 17, 1813. His *Life* was written by A. W. Drury, and published in 1884.

OTTERBEIN UNIVERSITY, an institution of learning, situated in Westerville, Ohio; organized in 1847 and named in honor of Bishop Philip William Otterbein, founder of the Church of the United Brethren in Christ. It was opened under the presidency of W. R. Griffith, with 81 students of both sexes. The institution was regularly chartered in 1849, with university privileges, under a new president, Rev. William Davis. The main college building was erected in 1871, to replace the former, destroyed by fire the previous year. The other buildings are Saum Hall, the Conservatory of Music and the new Christian Association Building. The courses include the classical and the philosophical; the faculty consists of 17 professors and instructors, and the number of students in 1895 was 225. There is a preparatory course of three years, post-graduate courses, and normal, art and music departments. The productive funds amount to \$75,000 and the total income to \$3,000 annually. There are seven thousand volumes in the library.

OTTER CREEK, a stream rising in the northern part of Bennington County, Vermont, and after flowing in a generally northerly direction, intersecting the counties of Rutland and Addison, empties into Lake Champlain at Ferrisburg. The river has a length of about ninety miles, is navigable for a distance of eight miles from its mouth, and furnishes water-power for the towns situated upon it, the leading ones of which are Rutland, Middlebury and Vergennes.

OTTERY ST. MARY, a town of England, on the river Otter, and on the London and Southwestern railroad, 11 miles E. of Exeter and 5 miles S.W. of Honiton. Twice the scene of a great conflagration, in 1767 and 1866, it retains its magnificent collegiate church, a reduced copy of the cathedral of Exeter, with the only other transeptal towers in England. The town has manufactories of silk, shoe-laces, handkerchiefs and Honiton lace, and is celebrated as the birthplace of the poet Coleridge. Population 1891, 3,855.

OTTO, KING OF BAVARIA. See BAVARIA, in these Supplements.

OTTUMWA, a city of Iowa. The growth of this city since 1880 has been rapid. There are six rail-

roads entering a general passenger depot, erected at a cost of \$125,000. The water-power has been developed until it is claimed to be the finest in the state. The various industries include iron-works and ruffler company, employing 500 men, machine, cutlery and stove works, linseed-oil, starch and flour mills, cigar factories, and a pork-packing establishment with a capacity of 5,000 hogs daily. These industries employ 3,000 men and have a capital of \$1,500,000. The city has many fine buildings, paved and graded streets, water-works, a good sewerage system, a fire department, gas and electric lights, several miles of electric street-railways, good public schools, 15 churches, normal school, business college and Roman Catholic Academy, state and national banks, with a combined capital of \$670,000, 3 daily and 8 weekly papers and a monthly periodical. Population 1890, 14,001; 1895, 16,761. See also OTTUMWA, Vol. XVIII, p. 70.

OUDE. See OUDH, Vol. XVIII, pp. 71-73.

OUIDA, novelist. See DE LA RAMÉE, LOUISA, in these Supplements.

OULACHAN or EULACHON, a fish of the smelt family found along the northern Pacific coast of North America. Its scientific name is *Thaleichthys pacificus*. The flesh is very oily, and from it large quantities of oil are extracted. It is called the candle-fish because it burns easily when dried. It is a finely flavored food-fish.

OULESS, WALTER WILLIAM, an English portrait-painter; born in St. Helier's, Jersey, Sept 21, 1848; educated at Victoria College, Jersey. He began to study art in London in 1864; first exhibited at the Academy in 1868. He at first devoted himself to subject-pictures, among them being *Home Again* and *An Incident in the French Revolution*, but on the advice of his friend, Sir John Millais, he adopted portrait-painting. Of his portraits, perhaps that of Darwin is most generally known, on account of the very fine etching from it by Rajon. Among his other portraits are those of John Bright, Cardinals Newman and Manning, Lord Roberts of Candahar, Sir Francis W. Grenfell, and Justice Manisty. He received one of the two grand gold medals given to England for art at the Berlin International Exhibition of 1886, and was named a chevalier of the Legion of Honor in 1889.

OURAY, a city and the capital of Ouray County, southwestern Colorado, about 15 miles N. of Silverton, at the base of Mount Hayden, on the Denver and Rio Grande railroad. It is situated in a rich mineral region, producing gold and silver abundantly, also copper and galena, and containing iron and sulphur springs. The surrounding scenery is noted for its grandeur and beauty. The city has lumber-mills and smelting-works. Population 1880, 864; 1890, 2,534. This section of the state was explored by the Georgians under Baker, who was killed by the Indians, on the Colorado River.

OURO PRETO, a Brazilian city. Population in 1890, 22,000. See OURO PRETO, Vol. XVIII, p. 74.

OUSE, a river of Yorkshire, England, formed near Boroughbridge by the union of the Ure and Swale; flows in a southeasterly direction, and after a course of about fifty-seven miles it joins with the

Trent to form the estuary of the Humber. Among the larger tributaries of the Ouse are the Wharfe, the Aire and the Don. The river is navigable for vessels of the largest size to Goole, eight miles up, and for vessels of moderate size to York, a distance of 43 miles. The navigation is improved by an extensive weir and large lock at Naburn, a few miles above which the stream skirts the well-wooded grounds of Bishopthorpe, the official residence or palace of the Archbishops of York.

OUSELEY, SIR FREDERICK ARTHUR GORE, an English musician; born in London, Aug. 12, 1825. At the age of 19 he succeeded his father, Sir Gore Ouseley (1770-1844), the Orientalist. He graduated at Christ Church, Oxford, and took orders, his first curacy being at St. Paul's, Knightsbridge. In 1850 he took the degree of Mus.B. at Oxford, and in 1854 that of Mus.D. In 1855 he succeeded Sir Henry R. Bishop as professor of music at Oxford, and in 1856 became vicar of St. Michael's, Tenbury. He had a unique knowledge of music, extending from St. Ambrose to Wagner. He published a *Treatise on Harmony* (1868); a *Treatise on Counterpoint and Fugue* (1869); *Treatise on Musical Forms and General Composition* (1875); edited Naumann's *History of Music* (1886), and wrote several oratorios, including *St. Polycarp* and *Hagar*. He devoted the whole of his fortune to building and endowing St. Michael's College, Tenbury, for the training and education of choristers. Havergal's *Memorials of F. A. G. Ouseley* were published after his death, which occurred at Oxford, April 6, 1889.

OVAMPOS, OVAMBO or OTJIHERERO, an industrious and peaceable Bantu people of the west coast of Africa, inhabiting Ovampoland, a country extending south of Cunene, in German West-Africa, to Damaraland. Some fifty miles from the coast the country rises into a lofty tableland, which is moderately fertile, then declines to the south and east into the deserts of the Kalihari and the region of Lake Ngami. Indications of copper ore appear in various places. Ivory is still an article of trade. An attempt to establish a republic here in 1885, under the name of Appengtonia, failed. See also AFRICA, in these Supplements.

OVARIES, reproductive organs. See REPRODUCTION, Vol. XX, pp. 408, 409. For those in plants, see BOTANY, Vol. IV, pp. 141, 142.

OVEN-BIRD, a name given to South American birds of the genus *Furnarius*. These birds build hemispherical nests, which resemble an oven or beehive. The name is also sometimes applied to the North American golden-crowned thrush (*Sciurus aurocapillus*).

OVERBECK, JOHANNES A., a Belgian archæologist; born in Antwerp, March 27, 1826; a nephew of F. J. Overbeck (q.v., Vol. XVIII, p. 76); educated at Bonn; privatdocent (1850); professor of archæology at Leipsic (1853). His works include *Kunstarchäologische Vorlesungen* (1853); *Pompeji* (1855; 4th ed. 1884); *Geschichte der Griechischen Plastik* (1857; 4th ed. 1892); *Die Antiken Schriftquellen zur Geschichte der Bildenden Künste bei den Griechen* (1868); *Griechische Kunstmythologie* (1871-87).

OVERSTONE (SAMUEL JONES-LLOYD), BARON, an English economist and financier; born in London, Sept. 25, 1796; educated at Trinity College, Cambridge; entered his father's banking-house on leaving college; was elected to Parliament in 1819 for Hythe, and in 1850 was raised to the peerage as Baron Overstone and Fotheringhay. The first of Lord Overstone's famous tracts on the Bank of England and the state of the currency was published in 1837, and was followed by others between that period and 1857. The proposal for making a complete separation between the banking and issue departments of the Bank of England, introduced by Peel into the act of 1844, was first brought forward in these tracts. He died Nov. 17, 1883.

OVERWEG, ADOLF, a German explorer; born in Hamburg, July 24, 1822; studied the natural sciences at Bonn and Berlin; accompanied Barth and Richardson in their expedition into Central Africa in 1850. He made known his discovery that the desert of the Sahara is in reality an elevated plateau, and not a depressed plain, as it was, up to the time of his discovery, supposed to be. He also explored Lake Tchad, the tributaries of the lake and the country surrounding it. He died while prosecuting his discoveries, near the lake, Sept. 27, 1852.

OID, a village of Clinton County, central part of the southern peninsula of Michigan, on Maple River, 10 miles E. of St. John and 65 miles E. of Grand Rapids, and on the Detroit, Grand Haven and Milwaukee railroad. It contains several machine-shops and manufactures of flour, lumber and carriages, and is the center of a district producing wheat and wool. Population 1890, 1,423; 1894, 1,312.

OID, a village and one of the capitals of Seneca County, southwestern New York, situated on a ridge between Seneca and Cayuga Lakes, about 25 miles S. of Waterloo, the other capital, and about 40 miles N. of Elmira. It is the center of a thriving local trade. About two miles from here, at the village of Willard, is the Willard Lunatic Asylum. Population 1890, 641.

OVUM. See REPRODUCTION, Vol. XX, pp. 413-418; and EMBRYOLOGY, in these Supplements.

OWATONNA, a city and the capital of Steele County, southeastern Minnesota, on Straight River, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads, 15 miles S. of Faribault and 71 miles S. of St. Paul. It is the seat of the State School for Dependent Children, contains a valuable mineral spring, has manufactures of flour, carriages and agricultural implements, and a good shipping trade for a region producing immense quantities of wheat and raising live-stock. Population 1890, 3,849; 1895, 4,891.

OWEGO, a town of New York. Population 1890, 9,984. See OWEGO, Vol. XVIII, p. 85.

OWEN, DAVID DALE, a Scotch geologist; born in New Lanark, June 24, 1807; settled with his father, Robert Owen, at New Harmony, Indiana, in 1825, but subsequently went to Germany to study geology and natural history. Returning to Indiana in 1833, he was employed by the state to make a geological survey of Indiana, the results of which are given in

his *Report of a Geological Reconnaissance in 1837* (1838). In 1839 the United States government appointed him to make geological surveys of Iowa, Wisconsin and Minnesota, the results of which were published in 1852. From 1852 to 1857 he made a geological survey of Kentucky, and in the latter year was appointed state geologist of Arkansas. The reports he published contained numerous plates, notably several on gigantic mammoth remains. He died at New Harmony, Indiana, Nov. 13, 1860.

OWEN, SIR PHILIP CUNLIFFE, a British promoter of industrial art; born June 8, 1828; entered the navy in 1840, but retired on account of ill health; in 1854 became clerk, in 1860 assistant director, of the South Kensington Museum, and in 1873 succeeded Sir Henry Cole as director. In 1876 he was executive commissioner at the Centennial Exhibition at Philadelphia, and in 1878 he served as secretary of the royal commission for the Paris Exposition. He took an active part in the International Fisheries Exhibition at London in 1883, the health and education exhibitions in 1884, the Music Exhibition in 1885, and the Colonial and Indian Exhibition in 1887. In all these cases he displayed great executive ability, and promoted the objects of the industrial arts materially. In 1873 he was knighted. He retired in 1893, and died in Lowestoft, March 23, 1894.

OWEN, SIR RICHARD, an English anatomist and zoölogist; born in Lancaster, England, July 20, 1804. He became assistant curator of the Hunterian Museum; in 1834 he was appointed professor of comparative anatomy at Saint Bartholomew's Hospital; Hunterian professor on the same subject at the Royal College of Surgeons in 1836; superintendent of the natural history department in the British Museum in 1856. From a femur sent



SIR RICHARD OWEN.

to him from New Zealand in 1839, he reconstructed the skeleton of the *Diornis* bird, and four years later, from fresh examples of subfossil bones, he distinguished five species of this genus. He was a master in the fields of animal fossils and of anatomy, a great collector and classifier of anatomical and palæontological remains, and profoundly versed in morphology. In these departments of science his name is linked with Cuvier, whom, in many respects, he resembled, both as to his anatomical insight and enthusiasm for palæontology. Toward the modern theories of the evolutionists Sir Richard Owen maintained a conservative, though by no means hostile, attitude. Besides his numerous contributions to the *Transactions* of the Royal, Linnæan, Geological and Zoölogical societies, he published descriptive catalogues of the specimens of physiology and comparative anatomy in the museum of the Royal College of Surgeons, together with a catalogue of the natural history, the osteology and the fossil organic remains preserved in that institution. In 1879 he

was knighted. He received distinguished honors from foreign states, and was a member of all the principal scientific societies of Europe and America. He died in London, Dec. 29, 1892.

OWEN, ROBERT DALE, a Scotch author; born in Glasgow, Nov. 7, 1800; educated at Fellenberg's school, at Hofwyl, Switzerland; in 1825 settled with his father, Robert Owen, at New Harmony, Indiana; in 1828 established, in New York, a weekly paper, *The Free Inquirer*, devoted to socialistic principles. In 1832 he returned to New Harmony. While a member of the Indiana legislature from 1835 to 1838, he did much to promote education in the common schools of that state. In 1843 he was elected to Congress, in which he served two terms. He took an active part in organizing the Smithsonian Institution, and was afterward appointed one of the regents of this institution, serving, also, as chairman of its building committee. From 1853 to 1858 he was at Naples, at first as United States *chargé d'affaires*, and afterward as United States minister. He received the degree of LL.D. from the University of Indiana in 1872. His later years were devoted to the propagation of spiritualism. His works include *On Education at New Lanark* (Glasgow, 1824); *Popular Tracts* (New York, 1830); *Moral Philosophy* (1831); *Pocahontas*, a drama (1837); *Hints on Public Architecture* (1849); *A Treatise on the Construction of Plank Roads* (1856); *Footfalls on the Boundary of Another World* (1860); *Policy of Emancipation* (1863); *The Wrong of Slavery* (1864); *Beyond the Breakers*; *Village Life in the West* (1870); *The Debatable Land Between This World and the Next* (1871); *Threading My Way: Twenty-seven Years of Autobiography* (1874). He died at Lake George, New York, June 24, 1877.

OWENS, JOHN E., an American actor; born in Liverpool, England, May 4, 1824; removed with his father to the United States in 1834; educated at Philadelphia; made his *début* in Philadelphia, Aug. 20, 1846, as an actor; was a great success as Jakey in a Philadelphian adaptation of *A Glance at New York*; became manager of the Baltimore Museum (1849); of the Charles Street Theater, Baltimore (1854), where he played in *Uncle Tom's Cabin*; of the Varieties Theater in New Orleans (1859). He toured twice in England, appearing at the Adelphi Theater, London, in 1865, as Solon Shingle. Other successes were Caleb Plummer, Aminadab Sleek and Dr. Pangloss. He played in *Esmeralda*, in New York and other leading cities, with the Madison Square Garden Company. He retired from the stage on account of ill health, and died in Towson, Maryland, Dec. 6, 1886.

OWENSBORO, a city and the capital of Daviess County, northwestern Kentucky, on the Ohio River, about 40 miles above Evansville, Indiana, and about 75 miles S.W. of Louisville, on the Louisville and Nashville, the Louisville, St. Louis and Texas and the Owensboro, Falls of Rough and Green River railroads. The city is the center of a region rich in agricultural and mineral products, and in timber. The leading industry is connected with the tobacco interests, the annual shipments reaching 18,000,000 pounds. There are numerous distilleries, lumber-

mills, railroad machine-shops and manufactures of furniture. There are a number of fine public buildings, including the United States Government Building, the Woman's College and a large theater; public schools for both white and colored children; state savings and national banks, with a combined capital of \$1,500,000; 18 churches of 7 denominations, and 2 daily and 4 weekly papers. The principal streets of the city are macadamized; there are gas and electric lights, and water is supplied by the Holly system. The population increased from 6,231 in 1880 to 9,837 in 1890.

OWENS COLLEGE. See MANCHESTER, Vol. XV, p. 462.

OWENS LAKE. See UNITED STATES, Vol. XXIII, pp. 794, 795.

OWEN SOUND, a town and port of entry and capital of Grey County, northwestern Ontario, at the outlet of Sydenham River, on Owen Sound, an arm of Georgian Bay, 130 miles N.W. of Toronto, and on the Canadian Pacific and the Grand Trunk railroads. It possesses a deep sheltered harbor, and has a large trade in lumber and grain, besides manufactories of furniture and woodenwares, machinery and woolen goods and ships. The Canadian Pacific steamers leave here for Port Arthur. Population 1891, 7,497.

OWENS RIVER AND LAKE. See CALIFORNIA, Vol. IV, p. 698.

OWL-PARROT or GROUND-PARROT. See KAKAPO, Vol. XIII, p. 825.

OWOSSO or OWASSO, a city of Shiawassee County, southeastern central southern peninsula of Michigan, on the Shiawassee River, and on the Ann Arbor, the Michigan Central and the Detroit and Grand Haven railroads, 78 miles N.W. of Detroit and 28 miles N.E. of Lansing. The river supplies abundant water-power, and the city has flour and planing mills, coffin, furniture and sash and blind factories, besides foundries and railway shops. Population 1890, 6,564; 1894, 8,272.

OX. See CATTLE, Vol. V, p. 244.

OX-BIRD. See SAND-PIPER, Vol. XXI, pp. 260, 261.

OXENFORD, JOHN, an English dramatist and critic; born in Camberwell in 1812; was called to the bar in 1833, but preferred a literary life; made himself familiar with French, German and Spanish literature, and became known by his admirable translations of such books as Goethe's *Dichtung und Wahrheit* and Eckermann's *Conversations with Goethe*. During the last thirty years of his life he was dramatic critic for the London *Times*, his criticisms being characteristic of the genial kindliness of his nature. His *Book of French Songs* showed as a translator a mastery of the lighter forms of verse. He wrote many plays; among them, the *Dance of Death*; the *Reigning Favorite*; the *Two Orphans*; as well as the libretto for *The Lily of Killarney*, and a farce, *Twice Killed*, that became widely popular. He died in London, Feb. 22, 1877.

OXENHAM, HENRY NUTCOMBE, an English theologian; born in Harrow, Nov. 15, 1829; educated there, and at Balliol College, Oxford; appointed curate of Dowinghall, Buckinghamshire (1854);

and of St. Bartholomew's, Cripplegate (1856); joined the Roman Catholic Church (1857); was a short time at the Oratory in London, and afterward professor at St. Edmund's College, Ware, and master at the Oratory School, Birmingham. He published *The Sentence of Kaires, and Other Poems* (1854); *Manual of Devotion for the Blessed Sacrament* (1854); *Church Parties* (1857); *Philip Paternoster: A Tractarian Love Story; The Catholic Doctrine of the Atonement* (1865); *Dr. Pusey's Eirenicon Considered* (1866, 1871); *Recollections of Ober-Ammergau in 1871* (1871); *Catholic Eschatology and Universalism* (1876); *Short Studies in Ecclesiastical History and Biography* (1884); *Short Stories, Ethical and Religious* (1885); *Memoirs of Lieutenant Rudolph de Lisle, R.N.* (1886); *Thoughts for Holy Week* (1886); translated *The First Age of Christianity and the Church*, by J. I. Döllinger (1866, 1871); *Lectures on the Reunion of the Churches*, by J. I. Döllinger (1872); edited *An Eirenicon of the Eighteenth Century* (1878).

OXFORD, a town of Calhoun County, north-eastern Alabama, 20 miles N.E. of Talladega, on the Southern railroad. It is situated in a region whose staple product is cotton, and is an important shipping-point for that product. Population 1890, 1,473.

OXFORD, a town of Newton County, north-central Georgia, about 38 miles E.S.E. of Atlanta, and 2 miles N. of Covington, the nearest railroad station, on the Georgia railroad. It contains the Palmer Institute, and is the seat of Emory College (Methodist Episcopal South), a co-educational institution established in 1837, having, in 1895, 14 instructors, 288 students and an equipment comprising 6 buildings and a library of 10,000 volumes. Population 1890, 791.

OXFORD, a town of Talbot County, eastern Maryland, and a popular summer resort, situated on the eastern shore of Chesapeake Bay, on a navigable arm known as Three Haven or Tred Avon River, 10 miles S.W. of Easton, on the Philadelphia, Wilmington and Baltimore railroad.

OXFORD, a township of Worcester County, central Massachusetts, on French River, 10 miles S. of Worcester and about 48 miles W.S.W. of Boston, and on the New England and the Boston and Albany railroads. It contains the villages of Texas, North Oxford, North Oxford Mills, West Oxford and Oxford, of which the last named is the largest and most important, having several churches, a public library, large boot and shoe factories, and cotton and woolen mills. The other villages are devoted to manufacturing. Population of the township in 1890, 2,616; 1895, 2,390.

OXFORD, a city and the capital of Lafayette County, northern Mississippi, about 30 miles S. of Holly Springs, on the Illinois Central railroad. It has a cotton gin and mill, cotton-compress, canning factory and planing-mill, and is the seat of the University of Mississippi (q.v., in these Supplements); of Warren Institute, a non-sectarian institution for secondary education; and of Union Female College (Cumberland Presbyterian), founded in 1854. Oxford was laid out in 1836, but during the Civil War was burned. Population 1890, 1,546.

OXFORD, a village of Chenango County, southern central New York, beautifully situated in the fertile valley of the Chenango River, eight miles S.S.W. of Norwich, on the Delaware, Lackawanna and Western and the New York, Ontario and Western railroads. The surrounding country is rich in dairy products, and has quarries of bluestone. The village contains Oxford Academy, and has manufactures of flour, sleds and baskets. Population 1890, 1,477.

OXFORD, a town and the capital of Granville County, northern North Carolina, 42 miles N. of Raleigh, on a northern affluent of the Tar River, and on the Southern railroad. It contains an orphan asylum, and is extensively engaged in the tobacco trade, having several manufactories and large warehouses. Tobacco is the staple product of the surrounding country. Population 1890, 2,907.

OXFORD, a village of Butler County, southwestern Ohio, 39 miles N.W. of Cincinnati, on the Cincinnati, Hamilton and Dayton railroad. It contains important manufactories of agricultural implements. It is the seat of Oxford College (Presbyterian), an institution established in 1849 for the education of women, which had, in 1895, 25 instructors, 208 students and a library of 5,000 volumes. Western Female Seminary, a non-sectarian institution of learning, and Miami University (q.v., in these Supplements) are also located here. Population 1890, 1,922.

OXFORD, a borough of Chester County, extreme southeastern Pennsylvania, 26 miles W. of Wilmington, Delaware, and about midway between Philadelphia and Baltimore, on the Lancaster, Oxford and Southern and the Philadelphia, Wilmington and Baltimore railroads. It contains manufactories of flour, candy and carriages; has eight churches, good schools, public library, water-works and electric lights; is the seat of Oxford Academy (Presbyterian), for secondary education; and of Lincoln University (Presbyterian), located three miles northeast of the borough, for colored pupils, established in 1854, which, in 1895, had 11 instructors, 191 students, a library of 11,000 volumes, productive funds of \$394,800 and an annual income of \$35,000. Population 1890, 1,711.

OXFORD FURNACE or OXFORD, a town of Warren County, northwestern New Jersey, 15 miles N.E. of Phillipsburg and 30 miles W. of Morristown, on the Delaware, Lackawanna and Western railroad. It contains many extensive foundries, furnaces, factories, machine-shops and mills. Population 1890, 2,383.

OXFORD MOVEMENT, or TRACTARIAN MOVEMENT, originated during the second quarter of the nineteenth century, and was a High Church reaction toward mediæval Roman Catholicism, as well as against rationalism and formalism. The first sign of the movement may be traced to the publication, in 1827, of John Keble's *Christian Year*. John Henry Newman was brought under the influence of this brilliant scholar, who preached a sermon, July 14, 1833, on *National Apostasy*, regarded by Newman as the real starting-point of the agita-

tion. The famous *Tracts for the Times* began to appear September 9th, the authors including such writers as Hugh James Rose, John Keble, John Henry (afterward Cardinal) Newman, Edward Bouverie Pusey, and other divines. These tracts extend to a series of ninety, and advocated apostolic succession, baptismal regeneration, confession, the real presence and the authority of the church and of tradition. The movement culminated in the neo-Catholic schism headed by Newman. See PUSEY, Vol. XX, p. 117.

OX-GALL, the bile of the ox as found in the gall-bladder. In composition it contains, in 100 parts, water, 90.44; biliary and fatty bodies, including resinoid acids, 8; mucus, .30; watery extract, chlorides, phosphates and lactates, .85; soda, .41. The union of the resinoid acids and the soda results in the soapy constitution of the bile. In medical practice it was formerly common to administer it to patients deficient in bile, to aid in the digestion of fats; in clysters, for the purpose of dissolving hardened masses of feces; and as a liniment, its properties being considered to be discutient. Artists use gall, refined from its coloring and coagulable matter, in mixing colors, improving their tint while also fixing them and making them flow easier. It is a constituent of some varnishes, and is used in cleaning ivory tablets for artists' use. See ABATTOIRS, in these Supplements.

OXLEY, JAMES MACDONALD, a Canadian lawyer and writer; born in Halifax, Oct. 22, 1855; educated at Dalhousie University, Halifax, and Harvard University, Cambridge, Massachusetts; admitted to the bar and practiced until 1883, when he was appointed legal adviser to the Marine Department, Ottawa; resigned in 1891, engaging in life insurance in Ottawa and Montreal. He published two law compilations, *Nova Scotia Decisions* (3 vols., 1880-83); and *Young's Admiralty Decisions* (1882); and the following works of fiction: *Bert Lloyd's Boyhood* (1889); *Up Among the Ice Floes* (1890); *The Chore-Boy of Camp Kipeway* (1891); *Donald Grant's Development* (1892); *Fergus MacTavish* (1892); *The Good Ship Gryphon* (1893); *Archie of Athabasca* (1893); *In the Wilds of the West Coast* (1894); *My Strange Rescue, and Other Stories* (1895); etc.

OXYCALCIUM LIGHT OR LIME-LIGHT. See MAGIC LANTERN, Vol. XV, p. 212.

OXYGEN AND OXIDES. See CHEMISTRY, Vol. V, pp. 477-481; and in these Supplements.

OXYHÆMOGLOBIN. See RESPIRATION, Vol. XX, p. 483.

OXYHYDROGEN BLOWPIPE. See OXYHYDROGEN FLAME, Vol. XVIII, pp. 105, 106; and BLOWPIPE, Vol. III, p. 837.

OYOMA, MARQUIS, a Japanese soldier and statesman. He won fame by his military skill and valor, and during the civil war in southern Japan gained such distinction that he was, on the outbreak of the Chino-Japanese war, put in command of an army mobilized at Hiroshima, Sept. 26, 1894. (For the operations of the war, see COREA, in these Supplements.) In January, 1895, he was placed in command of the third army of the Japanese. Marshal

Oyama was promoted from the rank of count to that of marquis in recognition of his services.

OYSTER. The oyster-fishery is by far the most important of the fishing industries of the United States. The American oyster (*Osrea virginiana*) is found along the Atlantic coast from Florida to the Gulf of St. Lawrence. In some portions of this range it occurs in natural beds of large extent, that of Long Island Sound being 115 miles in length. Chesapeake Bay, with its many inlets and river mouths, is the best-adapted home for the American oyster. It attains here its highest excellence. The bottom of this bay is almost covered with beds of the finest oysters in the world. Baltimore is the most important mart in the oyster trade. It cans and pickles vast quantities of oysters for shipment to the West and to foreign countries. Farther south the coast oysters occur plentifully, but are only gathered for local use. On the coast of Georgia they occur, in some places, in such abundance as to form natural breakwaters firm enough to resist the billows of the ocean. The coast region here is made up of salt marshes from 12 to 18 miles wide, through which slow-flowing rivers make their way to the sea. These rivers flow between banks of living oysters so closely compacted that a vessel might, in some places, obtain a cargo in a space only three or four times its own length. Oysters abound, also, in the inlets and small bays of the Gulf of Mexico. In the Bay of Mobile they are plentiful and of excellent quality, and are cultivated on a large scale. In Louisiana are beds of oysters unsurpassed in size and flavor. On the Pacific coast, oysters exist abundantly, in the Strait of Fuca and in Puget Sound. These oysters are, however, quite small, but of fine flavor. The Eastern oyster has lately been introduced on the Pacific coast, and seems to be susceptible of easy cultivation there. In like manner oysters of the Chesapeake are brought to Long Island and planted there to supply the beds that have become exhausted by over-dredging.

Oysters are said to be fatter in winter than in summer. What is called "fat" in the oyster is, however, no fat at all, but a deposit of protoplasm, which forms a very digestible and highly nutritious food for man. It is laid down in the mantle or fleshy portion of the animal during the winter season, and again exhausted during the reproductive period in summer, when the oyster becomes poor and non-nutritious. The so-called "fattening," by removing the oysters for a few days to water fresher than that in which they grew, is a dealer's trick. The oyster absorbs more fresh water than sea-water. By this means it becomes plumper, and at the same time loses part of its saltiness. Some dealers even warm the water by means of steam, in order to induce the oyster to take in more water, and thereby become plumper.

The principal food of the oyster consists of microscopic beings and fragments of organic matter, which are carried by the currents of water to the mouth of the animal at the hinge end of the shell. When this material is examined through the microscope, it is seen that the animal subsists largely upon what scientists call "diatoms"—one of the lowest

types of moving plants which swim in the water, encased in minute sandstone cases or boxes of delicate workmanship. When these have been found in the intestines of the oyster, they have usually had their living contents already dissolved out by the action of the gastric juice.

Some American oyster-lovers reject green oysters, under the impression that they are poisonous, or at least unhealthy. In France and England green oysters are looked upon as a special delicacy. They bring higher prices than the ordinary varieties. Investigation has demonstrated that their green color is due to the eating of green vegetable food, as the young grass growing on the bottom of shallow oyster-beds. The chlorophyll of the green food is absorbed in such quantities as to tint the blood-cells of the animals greenish. Green oysters are, in reality, more palatable and nutritious than white ones.

As to the statistics of the oyster-fishery in the United States we take from the census report of 1890 the following data, giving the value produced by molluscan fishery (oysters, clams and scallops), in the maritime states during that year: Alabama, \$107,812; California, \$782,627; Connecticut, \$1,476,435; Delaware, \$75,910; Florida, \$109,649; Georgia, \$40,820; Louisiana, \$299,896; Maine, \$165,478; Maryland, \$5,304,092; Massachusetts, \$343,171; Mississippi, \$166,672; New Hampshire, \$975; New Jersey, \$2,142,444; New York, \$3,570,211; North Carolina, \$188,457; Oregon, \$3,887; Pennsylvania, \$101,850; Rhode Island, \$359,216; South Carolina, \$23,204; Texas, \$127,990; Virginia, \$2,556,098; Washington, \$153,695.

The total value of the product of the United States molluscan fisheries, as sold for the year preceding the census enumeration of 1890, is given as \$18,100,598.

Baltimore packs 7,000,000 bushels per annum. The industry in Maryland is now protected by legislation, and directed by a state commission. An oyster three months old is the size of a quarter-dollar, six months old, a half-dollar, but is not fit to eat before

COUNTRY.	BUSHEL.	VALUE.
United States-----	29,796,387	\$16,638,805
Great Britain-----	2,760,000	6,200,000
France-----	2,000,000	5,000,000
Holland-----	70,000	444,000
Italy-----	65,000	200,000
Canada-----	152,580	183,846
Germany-----	13,000	75,000
Miscellaneous-----	400,000	600,000
Totals-----	35,256,967	\$29,341,651

four years old. The oyster-beds established by advice of Abbé Bonnetard in France produced 97,000,000 oysters in 1831. (See Vol. XVIII, pp. 106-110.)

A comparison of the oyster-product of the world is shown in the preceding table, given in *The Oyster Industry of Maryland* (1894):

The comparative consumption of the bivalve in three of the principal cities is seen by the following figures (*Mulhall's Statistics*):

	CONSUMPTION, MILLIONS.	PER INHABITANT.
London-----	220	60
Paris-----	57	26
New York-----	810	660

OYSTER-DRILL, a name which the oyster-fishermen apply to a small gasteropod mollusk (*Vrozalpinx cinerea*) of the family *Muricidae*. It is said to drill holes in the shell of the oyster with its lingual ribbon, in order to reach the soft parts.

OYSTER-PLANT. See *Salsify*, under HORTICULTURE, Vol. XII, p. 287.

OZARK, a village and the capital of Dale County, southeastern Alabama, about 45 miles S.W. of Eufaula and about 75 miles S.S.E. of Montgomery, on the Alabama Midland railroad and the Central Railroad of Georgia. It is in an agricultural and pine forest region, and has a tannery, a cotton-gin factory, and flour, cotton, saw and grist mills. Population 1890, 1,195.

OZARK, a town and the capital of Franklin County, northwestern Arkansas, on the Arkansas River, 43 miles below Fort Smith, and on the St. Louis, Iron Mountain and Southern railroad. The surrounding country is hilly, coal is found, and cotton, corn, sweet and white potatoes, hogs and livestock are produced. The town has a cotton-gin. Population 1890, 862.

OZARK MOUNTAINS, a series of mountains, or more properly hills or ridges, as they nowhere exceed two thousand feet in elevation, steep and heavily timbered, extending from southeastern Missouri throughout eastern Arkansas into Indian Territory. In their mineral structure these mountains resemble the Alleghanies. Coal, iron and lead have been found in them, and deposits of the precious metals are believed to exist. The Ozark region of Missouri was for many years noted for the deeds of lawlessness which were committed there.

OZONE. See CHEMISTRY, Vol. V, pp. 481-483; and in these Supplements.

P

PABNA—PACIFIC RAILWAYS

PABNA, a town of Bengal, India, and capital of the district of Pabna, on an arm of the Ganges, 115 miles N. of Calcutta. It has government buildings, a hospital and indigo-works. Population, 16,500, composed of Hindus and Mohammedans. The district has an area of 1,847 square miles and a population of 1,311,728. It is a fertile plain, traversed by numerous water-courses.

PACA or **CÆLOGENYS PACA**. See *Dasyproctidae*, under **MAMMALIA**, Vol. XV, p. 420.

PACA, WILLIAM, a signer of the Declaration of Independence; born in Maryland, Oct. 31, 1740. He studied law and was admitted to the English bar, and on his return home opposed the Stamp Act and other tyrannical measures of the British government. From 1771 to 1774 he was a member of the Maryland legislature, and from 1774 to 1779 served in the Continental Congress. He signed the Declaration of Independence, became state senator, afterward held two judicial offices, and was governor of Maryland from 1782 to 1786. He died in Maryland in 1799.

PACCHIONIAN BODIES. See **ANATOMY**, Vol. I, p. 865.

PACHUCA, a mining town and the capital of the state of Hidalgo, southeastern central Mexico, 56 miles N.N.E. of Mexico, on the Hidalgo and North-Eastern, Mexican, and Mexican Central railroads. It is situated in a valley surrounded by lofty mountains, and is celebrated for its silver-mines, which were worked before the Spanish conquest, and, with the neighboring mines of Real del Monte, produce one sixth of all the silver mined annually in Mexico, the yearly reduction of ore being from 70,000 to 90,000 tons. Here, in 1557, Bartolomeo Medina discovered and first used the *patio* process for extracting ore by the help of sulphide of copper, salt and mercury. Population 1892, 32,815.

PACIFIC, a town of Franklin County, eastern Missouri, on the Marome River, and on the Missouri Pacific and the St. Louis and San Francisco railroads, 37 miles W.S.W. of St. Louis. It has rich beds of white-glass sand and fire-clay, deposits of iron, copper and lead, and a flour-mill, sand-crusher and tripoli factory. Population 1890, 1,184.

PACIFIC RAILWAYS. In 1856 both the Democratic and Republican national conventions adopted resolutions in favor of granting government aid to the construction of a railroad to the Pacific Coast. Similar resolutions were adopted at the conventions of 1860, and the breaking out of the Civil War, with the unfriendly attitude of Great Britain and France toward the Federal government, established the need of such a road as a war measure, if for no other purpose. Ac-

cordingly, a bill, providing for the construction of a railroad connecting the eastern system with the one which had begun to come into existence on the Pacific Coast, passed the Congress June 24, 1862, and was approved July 1, 1862, by President Lincoln.

By this act the Union Pacific Railroad Company was chartered to construct a railroad and telegraph line from the Missouri River, at Omaha, Nebraska, to the western boundary of Nevada, in the general direction of San Francisco. The Central Pacific Railroad Company, a corporation organized under the laws of the state of California, was recognized by this act, and authorized to extend its line to the eastern boundary of California, and, if necessary, to continue the construction beyond that point to a connection with the Union Pacific. The Leavenworth, Pawnee and Western Railroad Company, a Kansas corporation, chartered to build a railroad from Leavenworth to Lawrence, was authorized to construct a line from Kansas City, along the valley of the Republican River, and to a junction with the Union Pacific at the 100th meridian, and to receive the regular subsidy in bonds and land for this mileage. The name of the company was thereupon changed to the Union Pacific Railway Company, Eastern Division. Another branch line was authorized to extend due west from Atchison, Kansas, to connect with the line from Kansas City, an estimated length of one hundred miles, and the Atchison and Pike's Peak Railroad Company proposed and was authorized to build that road; whereupon the name of that company was changed to the Central Branch Union Pacific Railroad Company. It was further provided that upon the completion of a railroad from Chicago or St. Paul to Sioux City, a line might be constructed from Sioux City to a connection with the Union Pacific or its Sioux City extension, and authority to construct such a road was granted to the Sioux City and Pacific Railroad Company, organized for that purpose on Aug. 1, 1864.

Government aid was granted for the construction of these lines, in the shape of a land grant of 6,400 acres per mile, together with United States subsidy six-per-cent thirty-year bonds of \$16,000 per mile for the branch lines and the portion of the main line from Omaha to the base of the Rocky Mountains, and from San Francisco to the base of the Sierra Nevadas—that is to say, for the level and easily constructed mileage; for the sections where the road climbed the two mountain ranges, the subsidy was increased to \$48,000 per mile; and for the plateau region between the Rocky Mountains and the Sierra Nevadas, the subsidy was to be \$32,000 per mile.

In consideration of these grants, the companies

were to complete their roads by July 1, 1876; to transport troops, munitions of war, postal matter, etc., for the United States at rates as favorable as those charged to private parties; to allow the use of their telegraph on similar terms; to pay into the Treasury of the United States five per cent of the net earnings of their respective roads, and allow the government to retain the whole of the charges for transportation on its account—the two sums so provided to be applied to the payment of interest on the government bonds as it matured, the companies also being required to pay the principal of the bonds at their maturity, together with any balance of interest that might then be due.

The act incorporating the Union Pacific authorized an issue of stock to the amount of \$100,000,000, the total issue, however, being limited in amount to the total cost of the road, and it was provided that, as conditions precedent to a permanent organization and the election of a board of directors, at least \$2,000,000 stock should be subscribed and ten per cent paid in thereon.

The Central Pacific Company formally accepted the terms offered by Congress on Oct. 7, 1862, and the work of construction was begun at Sacramento on Jan. 8, 1863.

The Union Pacific effected a temporary organization, and subscription-books were opened in the leading cities of the country. On Oct. 29, 1863, \$2,177,000 of the stock had been subscribed and \$217,700 (ten per cent) paid in thereon, and accordingly the company was permanently organized. The amount of paid-up stock subscriptions was soon used up, and as no further subscriptions could be secured, the company became pecuniarily embarrassed. The capitalists of the country did not consider the Union Pacific a promising investment as matters stood, the prices of both labor and materials being abnormally high at the time, and for these and similar reasons they held aloof from the enterprise. At the request of the Union Pacific, therefore, Congress, in 1864, amended the former act by making terms more favorable to the companies, the chief of these being preference to an amount of bonds to be issued by the companies equal to the subsidy bonds of the government, and a provision that the government should pay over to them one half of the charges for services on its account. Also, the land grant was increased to 12,800 acres per mile, making the total grant to all the companies about 39,000,000 acres. The transcontinental line was completed May 10, 1869, the Union Pacific having constructed 1,034 miles from Omaha, Nebraska, to Ogden, Utah, and the Central Pacific, beginning at Sacramento, 743 miles. Meanwhile, the Central Pacific Company had assigned to the Western Pacific Railroad Company the right to construct the road from Sacramento to San José, together with the benefits and responsibilities attaching to the work, and on Sept. 1, 1869, the road was completed and put in operation.

In 1869 the Sioux City and Pacific railroad

was completed from Sioux City to Fremont, Nebraska, 102 miles, and in 1870 the Union Pacific Railroad Company, Eastern Division, completed its line from Kansas City to Denver, 638 miles.

By the act of 1862 the line from Sioux City was intended to run to the 100th meridian, but the amendment of 1864 allowed a junction either with the Union Pacific's Sioux City branch (proposed) or with the main line of that road. To cross the Missouri River immediately at Sioux City and proceed in a southwesterly direction, according to the intention of the act, would have placed the whole land grant in Nebraska. There were more valuable lands in western Iowa, so the projectors chose a course slightly east of south from Sioux City, and crossed the river at a point only a little way above Omaha. The junction with the Union Pacific was at Fremont, a short distance west of Omaha.

The projectors of the Union Pacific, Eastern Division, doubting that the Union Pacific would ever build its road as originally planned, procured the insertion into the act of July 2, 1864, of a section providing that if the line from Omaha had not been constructed when the Eastern Division reached the 100th meridian, the latter might proceed to build westward on the proposed route of the Union Pacific, and receive the subsidy, for such work. In 1866, however, the Eastern Division was released from the necessity of joining the Union Pacific at the 100th meridian. Under the authority granted by this act, the old route by way of the Republican fork of the Kaw River was abandoned, and a new one, following the Smoky Hill branch of that stream, was adopted, the point of divergence from the original route being Fort Riley. It was the intention of the company to build its road southwest from Denver through New Mexico and Arizona, and on to the southern part of California; but this plan was frustrated by the act of 1866, which required the Eastern Division to join the Union Pacific at a point not more than fifty miles west of Denver. The act extended the company's land grant to cover the additional mileage to its junction with the Union Pacific, but the issue of subsidy bonds was confined to the length of line (394 miles) originally provided for. In March, 1869, authority was obtained from Congress to transfer to the Denver Pacific Railway and Telegraph Company, a Colorado corporation, all the rights and privileges to which the company was entitled for the construction of a railroad between Denver and the junction with the Union Pacific at Cheyenne; and in the same month, by special act of Congress, the company was authorized to assume the title of Kansas Pacific Railway Company. The Denver Pacific line was opened June 23, 1870.

The Central Branch Union Pacific, the last of the branch lines provided for, was completed from Atchison to Waterville, Kansas, one hundred miles, and opened Jan. 20, 1868. Subsidy bonds for the first completed section of twenty miles

were issued Aug. 2, 1866, those for the fifth and last section Jan. 24, 1868.

Meanwhile, rumors had begun to be circulated impugning the reports of the commissioners who had accepted the several sections of the Pacific railroads, and hinting at unlawful means employed by the companies to secure these reports. In consequence, Congress, in April, 1869, appointed a committee to investigate the affairs of the Union Pacific Company, and inquire whether its charter had not been forfeited. At the same time provision was made for the appointment of a commission to examine the roads and ascertain whether they fulfilled the requirements of law, and also what further expenditures were needed to make them first-class roads. Its report was handed in Oct. 30, 1869, and it specified the improvements needed.

When the matter came up in Congress in 1876, the Judiciary Committee of the House reported that "the railroad companies concede that one half of the compensation for services, and perhaps five per cent of the net earnings, of the roads should be applied, so far as they will go, in reducing the interest account, but they claim that they are not required in any other manner to pay any of the interest until the maturity of the subsidy bonds, *and not even then.*"

"The following table shows the principal of the subsidy bonds issued to each company, the amount which each company would owe the government at the maturity of the subsidy bonds for interest paid by the government, with interest compounded thereon, and the amount of interest paid to maturity of subsidy bonds without any interest computed thereon."

NAME OF COMPANIES.	DATE OF MATURITY OF SUBSIDY BONDS.	PRINCIPAL OF SUBSIDY BONDS.	COMPOUND INTEREST TO MATURITY.	SIMPLE INTEREST TO MATURITY.
Central Pacific -----	Nov. 18, 1897	\$25,885,120	\$126,619,733 30	\$46,593,216 00
Kansas Pacific -----	Nov. 17, 1896	6,303,000	30,831,774 36	11,345,400 00
Union Pacific -----	Sept. 3, 1897	27,236,512	133,230,206 60	49,025,721 60
Central Branch Union Pacific -----	Oct. 20, 1896	1,600,000	7,826,564 96	2,880,000 00
Western Pacific -----	Sept. 5, 1898	1,970,560	9,639,197 41	3,547,008 00
Sioux City and Pacific -----	Jan. 1, 1898	1,628,320	7,965,095 16	2,930,976 00
Totals -----		\$64,633,512	\$316,112,571 79	\$116,322,331 60

In January, 1872, another Congressional committee was appointed "to make inquiries in relation to the affairs of the Union Pacific Railroad Company and the Crédit Mobilier of America." The outcome of this investigation was the law of March 3, 1873, which, among other things, repealed the requirement that the government should pay over to subsidized railroad companies one half of the charges for transportation on government account, thus restoring the text of the act of 1862. The Union Pacific tested the right of the government to retain full transportation charges in the courts, which decided that the government could only retain one half of the charges on its account, and that no interest on the subsidy bonds was payable until their maturity, except the five per cent of net earnings and one half of charges on government transportation. The supreme court decision to this effect was handed down some time in 1876.

A proposition was now made to the government that the company should pay into the United States Treasury \$500,000 per annum for ten years commencing July 1, 1875, \$750,000 per annum for ten years commencing July 1, 1885, and \$1,000,000 annually thereafter until the maturity of the bonds; the money so paid in, together with the sum of \$800,000 claimed by the company as due it for government transportation at the time of making the proposition (February, 1875), to be held by the Secretary of the Treasury as a sinking-fund, devoted to the extinction of the government mortgage, compound interest to be allowed on the money so held at the rate of 6 per cent per annum.

Notwithstanding this enormous equitable obligation, the railroad companies were able to defeat all measures to bring them to terms. They were content with the position in which the courts had placed them.

Alarmed at the rapid rate with which the balances against the companies on account of interest was increasing, Congress passed, in 1878, what is known as the Thurman Bill for the establishment of a sinking-fund for both Union Pacific and Central Pacific. This act provided that there should be carried to the credit of the sinking-fund, on the 1st of February in each year, the one half of the compensation for government service, and also the sum of \$850,000, or so much thereof as would be necessary to make the five per cent of the net earnings of the road payable to the United States under the law of 1862, and the whole sum earned as compensation for government service; also, a sum amounting to 25 per cent of the whole net earnings of the road, the net earnings to be ascertained by deducting from the gross earnings the expenses of operation, together with interest on first-mortgage bonds.

This measure materially increased the yearly amounts to be paid to the government, but even then they were not sufficient to pay the interest and meet the requirements of the sinking-fund. Consequently, the debt due to the government increased steadily, and, as the dates of maturity of the several issues of bonds drew nigh, alarm began to be felt for the security of the government's claim. Measures looking to the settlement of the vexed question were introduced in Congress, but were passed on from session to session with-

out any satisfactory solution of the problem being reached. Meanwhile, the Union Pacific had become financially embarrassed and its property placed in the hands of receivers. To sell the property under foreclosure of its first mortgage the government recognized would put its claim in imminent jeopardy, and therefore renewed efforts were made to bring about a settlement. Several projects were urged, agreeing, however, in principle. They proposed funding the government claim in very long-time bonds, even to eighty years, at low rates of interest, and making these obligations a first lien on all the property of the defaulted companies. But at the close of 1896 the hard problem had not been solved and no settlement had been reached.

The debt matures rapidly; indeed, several blocks of it, running into the millions, have already been paid by the government and larger amounts will shortly fall due. The plan of the Reorganization Committee of the Union Pacific proposes to set aside \$35,755,280 in new four per cent bonds to pay the debt of the United States, or meet other "extraordinary requirements," and \$20,864,400 of the new preferred stock for the same purposes. See also RAILROADS, in these Supplements.

JOHN P. MEANY.

PACINIAN CORPUSCLES. See ANATOMY, Vol. I, p. 861; and TOUCH, Vol. XXIII, pp. 478-480.

PACING. See TROTTING AND PACING, in these Supplements.

PACKARD, ALPHEUS SPRING, an American naturalist; born in Brunswick, Maine, Feb. 19, 1839; the son of Dr. A. S. Packard (1798-1884), president of Bowdoin College; graduated at Bowdoin (1861) and at Maine Medical College (1864); served as an army surgeon (1864-65); state entomologist of Massachusetts (1871-73); director of the Peabody Museum at Salem, Massachusetts (1868-76). In 1878 he was appointed professor of zoölogy and geology at Brown University. He was a member of the United States Entomological Commission and wrote largely on insects, and was one of the editors of the *American Naturalist*. His publications include *Observations on the Glacial Phenomena of Labrador and Maine, with a View of the Recent Invertebrate Fauna of Labrador* (1867); *A Guide to the Study of Insects, and a Treatise on Those Injurious and Beneficial to Crops* (1868-69, 7th ed. 1878); *Embryological Studies on Diptera, Perithemis and the Thysanurous Genus Isotoma* (1871); *Our Common Insects* (1873); *Life Histories of Animals, Including Man* (1876); *A Monograph on the Geometric Moths or Phalanidæ of the United States* (1876); *Insects of the West* (1877); *Half-Hours With Insects: Their Habits, Modes of Life* (1877); *Zoölogy for Students and General Readers* (1879); *Zoölogy, American Science Series* (1880); *Insects Injurious to Forest or Shade Trees* (1881); *Elementary Zoölogy* (1886); *Entomology for Beginners* (1888); *A Naturalist on the Labrador Coast* (1888); *The Labrador Coast* (1892).

PACKER, ASA, an American philanthropist;

born in Groton, Connecticut, Dec. 20, 1806. He acquired an interest in boating coal to Philadelphia; in 1831 established a store and boatyard, and entered on various extensive schemes of mining and transportation that were highly remunerative. Later, he became county judge, and eventually, from the profits of his many successful ventures, rose to be the wealthiest person in Pennsylvania. From 1853 until 1857 he was a Democratic member of Congress. In 1865 Mr. Packer gave \$500,000 and 115 acres of land for the erection of Lehigh University at Bethlehem, Pennsylvania, and in his will increased the endowment to \$1,500,000, with \$500,000 additional for a library. He died in Philadelphia, May 17, 1879.

PACKING now includes the whole processes connected with the "manufacture" of the products from cattle, sheep and hogs for the various demands of the market. The term was formerly applied solely to the curing and packing of hog-products, but around this industry arose the no less profitable and indispensable ones for preparing the products of cattle and sheep. Associated, also, with these, many new industries sprang up as a result of scientific methods of utilizing the waste products, which secured in themselves a handsome profit.

The origin of packing is obscure. It has been stated, though the authority is doubtful, that pork was cured and packed in barrels in Salem, Massachusetts, as far back as 1640. In 1690 Boston had a large trade in packing. In 1818 Elisha Mills established a packing-house at Cincinnati. In 1832 Cincinnati slaughtered 85,000 hogs. No attempt at packing in Chicago seems to have been made until about 1832. It has been claimed that 9,600 hogs were packed in Chicago in 1834; but it was not until 1850 that the city figured in the statistics. In 1845 Cincinnati boasted of the title of Porkopolis, when its business even exceeded that of Cork or Belfast, Ireland. About that time the number of regular packing-houses in that city were 26, ten years later the number was 41, after which time the number remained about stationary. In 1843-44 the total number of hogs packed in the West reached a total of over 1,000,000. Cincinnati held her own until 1861-62; then Chicago passed her and has since maintained the lead, this center handling about 35 per cent of the total number of hogs marketed in the West. Writing in 1895 on the packing industry in *One Hundred Years of American Commerce*, Philip D. Armour said: "During the past ten years Western packers have paid out \$1,429,000,000 for hogs, or an annual average of about \$143,000,000, reaching \$172,679,000 for the year ending March 1, 1895." The aggregate value, in 1844, of 623,000 animals (cattle, sheep and hogs) marketed in Boston, New York, Philadelphia and Baltimore was \$7,500,000. In 1894 the value of the 9,445,782 animals marketed in the same cities was, approximately, \$140,000,000.

Of the total number of 21,619,645 hogs packed and marketed in the United States for the year

ending March 1, 1895, the largest numbers were credited to the following cities: Chicago, 5,293,202; Kansas City, 2,105,333; Omaha, 1,550,821; Boston, 1,748,000. The number of cattle killed in the four Western cities (Chicago, St. Louis, Kansas City and Omaha) was, in 1894, 3,958,000; and on the seaboard, 1,079,000. The number of sheep killed in the West for the same year was 3,564,000; and for the East, 4,079,000.

The capital invested in the United States in the packing industry, as estimated for the year 1890, was \$116,887,504.

The following figures represent the total amounts exported, and the values thereof, of beef and pork products and mutton, for the year ending June 30, 1895:

BEEF-PRODUCTS.		
	Pounds.	Value.
Beef, canned-----	64,102,263	\$5,720,933
Beef, fresh-----	191,338,487	16,832,860
Beef, salted-----	62,473,325	3,558,230
Beef, other cured-----	821,673	73,569
PORK-PRODUCTS.		
Bacon-----	452,549,976	\$37,776,293
Hams-----	105,494,123	10,960,567
Pork, fresh-----	818,581	60,660
Pork, pickled-----	58,266,893	4,138,400
Mutton-----	591,449	\$47,832.

For utilization of products and methods of killing and dressing, see ABATTOIRS, in these Supplements.

PACTOLUS, a stream of Asia Minor whose golden sands were said to have been the source of the wealth of Cræsus. See LYDIA, Vol. XV, pp. 98, 99; also SARDIS, Vol. XXI, p. 310.

PADANG. See SUMATRA, Vol. XXII, pp. 638, 639.

PADDLE-FISH (*Polyodon spatula*), a ganoid fish in which the nose is greatly prolonged into a paddle-like structure, which is sometimes one fourth the length of the fish itself. This paddle is used for stirring the mud of the bottom when the fish is in search of food. The fish may reach a length of six feet. It is common in rivers of the Mississippi system. The names *spoonbill* and *duckbill-sturgeon* are often applied to this fish.

PADEREWSKI, IGNACE JAN, a Polish pianist; born in Podolia, a province of Russian Poland,

Nov. 6, 1860. He began to play on the piano at the age of three years. At the age of seven he was placed under the instruction of Pierre Sovinski, a local master. In 1872 he went to Warsaw, where the foundation of his knowledge of harmony and counterpoint was laid by Roguski. Later he pursued his musical studies under Frederick Kiel, in Berlin. His first musical



I. J. PADEREWSKI.

tour was made through Russia, Siberia and Roumania, during which he played his own com-

positions. At eighteen years of age he became professor of music in the Conservatory of Warsaw. In 1884 he was promoted to a professorship in the Conservatory of Strasburg; but in less than a year he determined to abandon teaching and enter upon the career of a piano virtuoso. After three additional years' study with Teschitzki, in Vienna, he began his professional tours, appearing in Germany; in 1889 at Paris, and in 1890 at London. He married at the age of nineteen. Later, his wife died, but a son survived her. In the autumn of 1891 he visited New York and began a tour of extraordinary success in the chief American cities. His American tour in 1893, when he visited the World's Fair at Chicago, brought him \$150,000. He repeated the visit in 1896, realizing \$187,000. He donated the sum of \$10,000, the interest of which was to be devoted to the encouragement of American composers by the award of three triennial prizes. He also dedicated to his American admirers a *Menuet Moderne*, in contradistinction to his *Menuet à l'Antique* (1883). Among his other original compositions are eighty vocal works. His *Polish Phantasia* was produced at the Norwich festival in 1893.

PADUCAH, a city of Kentucky. Paducah in 1890 was a center for three railroads, the Chesapeake and Ohio Southwestern, the Paducah, Tennessee and Alabama and the St. Louis, Alton and Terre Haute. Its tobacco trade has reached large proportions, there being numerous factories and warehouses, making this city one of the most important tobacco-markets in the United States. Other industries include saw and flour mills, foundries and machine-shops, carriage factories and ship-yards. Paducah makes extensive shipments of corn, pork and iron. The city has parks, gas and electric lights, electric street-railways, water-works and fire department, good public schools, a young ladies' seminary, 19 churches, two daily and four weekly newspapers. Population 1890, 12,797. See also PADUCAH, Vol. XVIII, p. 132.

PAGANISM. See CHRISTIANITY, Vol. V. p. 696.

PAGE, THOMAS NELSON, an American lawyer and author; born in Oakland, Virginia, April 23, 1853; educated at Washington and Lee University; received the degree of LL.B. from the University of Virginia in 1874. He practiced law in Richmond. The degree of LL.D. was conferred upon him by Washington and Lee University in 1887. His first story, *Uncle Gab's White Folks*, appeared in *Scribner's Magazine* in 1877. His next, *Marse Chan*, appeared in the *Century Magazine* during 1884. This was followed by *In Ole Virginia*, including the latter and other stories (1887); *Two Little Confederates* (1888); *Befo' de War*, dialect poems, in collaboration with A. C. Gordon (1891); *Elsket and Other Stories* (1891); *Among the Camps* (1891); *The Old South*, essays (1892); *Pastime Stories* (1894); *Unc' Edinburg* (1895).

PAGE, WILLIAM, an American portrait-painter; born in Albany, New York, Jan. 23, 1811; studied

painting under Samuel F. B. Morse and at the National Academy of Design. After that he studied theology at Andover and Amherst for two years. His faith being shaken, he returned to painting again. Settling down in New York City, he executed likenesses of William L. Marcy, John Quincy Adams, Beecher, Browning and others. In 1836 he was elected a full member of the National Academy. From 1849 to 1860 he resided in Europe, chiefly at Florence and Rome. Among his works are *The Holy Family*; *The Infancy of Henry IV*; *Antique Timbrel-Player*; *Farragut's Triumphant Entry into Mobile Bay*; *Shakspeare, from the German Death-Mask*; *Moses*; *Ruth*; *Venus*, the latter, painted in Rome in 1859, being perhaps his finest production. He delivered a series of lectures to the students of the National Academy of Design. He died in Tottenville, New York, Oct. 1, 1885.

PAGET, SIR AUGUSTUS BERKELEY, a British diplomatist; born in 1823; became précis writer to the late Earl of Aberdeen in 1846; attaché to the embassy of Paris the same year; and secretary of legation at Athens in 1852. After filling diplomatic offices in Egypt, Holland and other countries, he was on several occasions *chargé d'affaires* at Lisbon; minister to Saxony in 1858; to Sweden and Norway in 1859; to Portugal in 1866; and to Italy in 1867. In March, 1876, he was nominated ambassador to Italy, and shortly afterward was sworn of the privy council. Sir A. Paget succeeded Sir Henry Elliott as British ambassador at Vienna, Jan. 1, 1884, and retired on a pension, July 1, 1893. He edited *The Paget Papers* of his father, Sir Arthur Paget. He died July 11, 1896.

PAGET, SIR GEORGE EDWARD, a British physician; born in Yarmouth, England, in 1809; educated at the Charterhouse and at Cambridge; took his B.A. degree in 1831; became Fellow of Caius in 1832; M.D. in 1838. In 1872 he was appointed regius professor of physic in Cambridge, and was knighted in 1885. He may well be regarded as a public benefactor, as having taken the principal part in the great advance that has been made in medical education. He died Jan. 29, 1892.—His brother, SIR JAMES PAGET, Bart., a British physician, was born in Yarmouth, Jan. 11, 1814; studied at St. Bartholomew's Hospital, London; became a member of the Royal College of Surgeons in 1836; honorary fellow in 1843; member of the council in 1865; president of the college in 1875; Croonian lecturer (heart) in 1857; delivered the Hunterian oration in 1877; Bradshawe lecturer in 1882; Morton lecturer (cancer) in 1887; sergeant-surgeon to the queen, surgeon to the Prince of Wales and consulting surgeon to St. Bartholomew's Hospital. He was created a baronet in 1871, and in the same year received the degree of LL.D. from the University of Edinburgh. Two standard works are *Lectures on Surgical Pathology* and *Clinical Lectures*. He was vice-chancellor of the University of London and a member of the Institute of France (Academy of Sciences).

PAGET, VIOLET, an English writer better known as "Vernon Lee"; born in 1857; lived chiefly in Italy. She devoted herself specially to the history of the arts, literature and drama of the latter country. In 1880 she published *Studies of the Eighteenth Century in Italy*; *Belcaro*, essays on sundry æsthetical questions (1882); *The Prince of a Hundred Soups*, a fairy tale (1883); *Ottolie, an Eighteenth Century Idyl* (1883); *Euphorion*, a collection of essays (1884); *The Countess of Albany*, a biography (1884); *Miss Brown*, a novel (1884); and *Baldwin*, a collection of essays and dialogues (1886); *The Phantom Lover* (1887); *Juvenilia* (1887); *Hauntings* (1890); *Vanitas* (1893); and *Althea* (1894).

PAGO PAGO HARBOR or PANGO PANGO, a seaport on the southeast coast of Tutuila, one of the Samoan Islands, in lat. 14° 19' S., long. 170° 31' W. It has an excellent natural harbor; was formerly used as a coaling-station by the United States, and later by Great Britain for the same purpose, but in 1892 was formally ceded to the United States. There is communication by steamer with Sydney and San Francisco.

PAH-UTES. See PIUTES, in these Supplements.

PAILLERON, EDOUARD, a French dramatist; born in Paris, Sept. 17, 1834; began life as a clerk in a notary's office, and published in 1860 a volume of satirical poetry, *Les Parasites*, and a one-act play, *Le Parasite*. Among his most successful subsequent productions are *Le Mur Mitoyen* (1862); *Le Dernier Quartier* (1863); *Le Second Mouvement* (1863); *Le Monde où l'on s'amuse* (1868); *Les Faux Ménages* (1869); *Hélène*; *L'Autre Motif* (1872); *Petite Pluie* (1875); *L'Âge Ingrat* (1878); *L'Étincelle* (1879); *Pendant le bal* (1881); *Le Monde où l'on s'ennuie* (1882). To the last piece of contemporary satire—for it is rather that than a play—M. Pailleron owes his election to the French Academy in 1882. He wrote also *La Souris*, which appeared in 1887; *Amours et Haines*; *Théâtre chez Madame*; *Discours Académiques*; *Le Départ*; *Prière pour la France*; *La Poupée*; *Études sur Emile Augier*; etc. He was promoted to be officer of the Legion of Honor in 1889.

PAIN, See TOUCH, Vol. XXIII, p. 482.

PAINE, JOHN ALSOP, an American archæologist; born in Newark, New Jersey, Jan. 14, 1840; graduated at Hamilton (1859); at Andover (1862); ordained (1867); devoted much attention to the natural sciences, especially to botany, in his *Plants of Oneida County and Vicinity* (1855); made many additions to the known lists of plants of the state of New York; was appointed professor of natural science at Robert College, Constantinople (1867), remaining there two years; was then appointed to the chair of natural history at Lake Forest University, Illinois (1870); went to Palestine (1872,) to make archæological researches and identified the site of Mount Pisgah. From 1882 to 1884 he published *The Journal of Christian Philosophy*; and in 1887 became, a member of the staff engaged in preparing *The Century Dictionary*.

PAINE, JOHN KNOWLES, an American musi-

cian and composer; born in Portland, Maine, Jan. 8, 1839; first appeared as an organist in Portland, June 25, 1857; studied under Haupt, Wieprecht and Teschner, in Berlin, from 1858 to 1861; returned to America, and was appointed instructor in music at Harvard in 1862; and made full professor (1876). In 1867 his *Mass* was produced at the Singakademie, Berlin, under his direction; his *Saint Peter* at Portland, June 3, 1873; composed the music of the *Centennial Hymn*, words by Whittier, sung at Philadelphia in 1876; his *Columbian March and Chorus* was produced at Chicago, Oct. 21, 1892. He produced several oratorios, cantatas, fantasies, symphonies and overtures, and wrote *Famous Composers and Their Works* (1892-94).

PAINE, ROBERT, an American clergyman; born in Person County, North Carolina, Nov. 12, 1799; he began to preach in the Methodist Episcopal Church (1818); was president of La Grange College, Alabama (1830-46); from 1844 to 1845 took a prominent part in the debates over the slavery question, which led to the separation of that church. In 1846 he became bishop in the Methodist Episcopal Church South. He wrote a small polemical work on *Hopkinsianism*, and a *Life of Bishop McKendree*. He died in Mississippi, Oct. 20, 1882.

PAINE, ROBERT TREAT, a signer of the Declaration of Independence; born in Boston, Massachusetts, March 11, 1731; graduated at Harvard in 1749; became first a preacher, and later studied law, and was admitted to the bar in 1759; prominent in the prosecution of a British regular army officer for his participation in the Boston Massacre of 1770. He served in the Colonial Legislature (1773); in the Provincial Congress (1774-75); and in the Continental Congress (1774-78). After the formation of the United States government he became attorney-general of Massachusetts (1780-90); judge of the supreme court of the state (1790-1804); and was founder of the American Academy of Massachusetts. He died in Boston, May 11, 1814.

PAINE, ROBERT TREAT, an American poet; son of the preceding; born in Taunton, Massachusetts, Dec. 9, 1773; graduated at Harvard in 1792, and began to contribute to the *Massachusetts Gazette*. In 1794 he established, and for two years conducted, a semiweekly paper, called the *Federal Orrery*, whose personalities made him numerous enemies. In 1794 the Federal Theater was built in Boston, when Paine became on a familiar footing with those attached to it, and married Miss Baker, an actress. This connection estranged him from his father and excluded him from fashionable society. For a time he left the playhouse, removed to Newburyport, Massachusetts, studied law under Theophilus Parsons, and in 1802 practiced his profession in Boston. However, he soon resumed his former interest in theatricals, wrote criticisms on the drama, led an unsettled and dissipated life and passed his closing days in destitution, dying in Boston, Nov. 13, 1811. His select writings were published by Charles Prentiss in 1812. *The Invention of Let-*

ters and *The Ruling Passion*, two poems, were published separately.

PAINE, WILLIAM H., an American civil engineer; born in Chester, New Hampshire, May 27, 1828; studied civil engineering; engaged in land-surveying in northern Wisconsin; went to California and surveyed a wagon-road across the Rocky Mountains in 1849; surveyed a route for a railroad across the Sierra Nevadas from Sacramento to Utah. On the outbreak of the Civil War he was appointed captain of engineers on the staff of General McDowell; promoted to colonel, serving to the close of the war on the general staff of the Army of the Potomac. He was one of the engineers of the East River Bridge in 1869; assisted the Roeblings in that work; afterward engaged in the construction of cable lines in different cities, and was consulting engineer of the Port Huron tunnel. He died in Cleveland, Dec. 31, 1890.

PAINESVILLE, a village and the capital of Lake County, northeastern Ohio, on Grand River, three miles from Lake Erie, about 30 miles E. of Cleveland, and on the Lake Shore and Michigan Southern, New York, Chicago and St. Louis and the Pittsburg and Western railways. It is the center of an agricultural and fruit-growing section, and has an extensive nursery and manufactories of steam-engines, machinery, metallic oilcloth bindings, sash and blinds, flour and leather. The village is the seat of Lake Erie Female Seminary, a non-sectarian institution chartered in 1856; has a bank with a capital of \$200,000, two libraries, one daily and three weekly papers. Population 1890, 4,755.

PAINT. See PIGMENTS, Vol. XIX, pp. 85-88.

PAINTED GOOSE or EMPEROR-GOOSE. See GOOSE, Vol. X, p. 778.

PAKENHAM, SIR EDWARD, a British soldier; born at Pakenham Hall, Westmeath, Ireland, March 19, 1778; the second son of the Earl of Longford and a brother-in-law of the Duke of Wellington. He entered the British army in 1794, fought with distinction in Spain, and particularly at Salamanca, where he carried off the honors of the day. In 1814 he was given command of the large force of British regulars which operated against New Orleans. Here he was opposed by General Andrew Jackson with a number of Mississippi and Tennessee militia. In the brief campaign which followed, Pakenham was entirely out-manuevered and was killed in the battle, Jan. 8, 1815.

PAKTONG or PACKFONG. See GERMAN SILVER, Vol. X, p. 446.

PALÆOTHERIUM (Gr., "ancient wild beast"), a genus of pachydermatous mammalia whose remains occur in the Eocene beds of England and the Continent. See *Paleotheriidae*, under MAMMALIA, Vol. XV, p. 429.

PALÆOZOIC AGE. See GEOLOGY, Vol. X, pp. 328-352.

PALAGONITE-TUFF, usually associated with basalt-lavas; is fine-grained, red, brown and sometimes greenish or yellowish in color. Under the microscope it is seen to be composed of minute fragments of volcanic glass, crowded among which are granules and crystals of augite, olivine, plagio-

clase and magnetite. It occurs in Sicily, the Canary Islands, the Faroe Islands, Iceland and Scotland.

PALAMEDEIDÆ, a family of birds with characters intermediate between the rails and ducks. Huxley included them with the ducks (*Anatidæ*) in the group *Chenomorphæ*. The family includes two genera with three species—all South American. The horned-screamer (*Palamedea*) is the typical genus. See SCREAMER, Vol. XXI, p. 552.

PALANQUIN, an Indian vehicle corresponding somewhat to the Roman litter and the modern European sedan-chair, but, unlike the latter, used for long distances by travelers where railways or good carriage-roads do not exist. It is a wooden box about eight feet long, four feet wide and four feet high, with wooden shutters which can be opened or closed at pleasure, constructed like Venetian blinds. At each end of the palanquin, on the outside, two rings are fixed, and the *hammals*, or palanquin-bearers, of whom there are four, two at each end, support the palanquin by poles passing through these rings.

PALAPTERYX, a genus of fossil birds whose remains are found in the river-silt deposits of New Zealand, associated with the gigantic *dinornis*, and which, like the *dinornis*, resembled in the form of the sternum and the structure of the pelvis and legs the living wingless apteryx. *Palapteryx*, however, seems to have possessed rudimentary wings. See *DINORNIS*, Vol. VII, p. 243.

PALATAL LETTERS. See **HIEROGLYPHICS**, Vol. XI, pp. 797, 798.

PALATE. See **DIGESTIVE ORGANS**, Vol. VII, p. 223; also **ANATOMY**, Vol. I, pp. 837, 838.

PALATINE. See **COUNTY**, Vol. VI, p. 513; also **DURHAM**, Vol. VII, pp. 559-561.

PALATINE, a village of Cook County, north-eastern Illinois, 26 miles N.W. of Chicago, on the Chicago and North-Western railroad. It is in a dairying and farming district, and has manufactories of sash, blinds and doors, besides flour, planing and flax mills. Population 1890, 891.

PALATINE HILL. See **ROME**, Vol. XX, p. 821.

PALATKA, a city and the capital of Putnam County, eastern Florida, 35 miles E. of Gainesville, on the St. John's River, and on the Florida East Coast, the Florida Southern, the Gainesville and Gulf and the Jacksonville, Tampa and Key West railroads; has a lumber-mill and a moss factory; cotton, sugar and oranges are shipped here in steamboats, which ply daily between Jacksonville and this place. Population 1890, 3,039.

PALE, IRISH. See **IRELAND**, Vol. XIII, p. 232.

PALEMBANG, a Dutch residency in SUMATRA, Vol. XXII, p. 639.

PALESTINE, a city and the capital of Anderson County, eastern Texas, about 150 miles N. of Houston, and 181 miles N.E. of Austin, on the International and Great Northern railroad, 10 miles E. of Trinity River. The surrounding country produces cotton, grapes, live-stock and lumber. The city has electric lights, water-works, one daily, one semi-weekly and two weekly newspapers; is the headquarters of the railway company; contains a cottonseed-oil mill and compress, a manufactory of brass and iron,

brickyards and saw and grist-mills, and has a good trade in hides. Population 1890, 5,838.

PALEY, **FREDERICK APTHROP**, an English classical scholar, grandson of William Paley, the author of the *Evidences*; born in Easingwold, England, June 14, 1816. He was converted to the Roman Catholic faith in 1846, and in 1874 was appointed professor of classical literature at the Roman Catholic College at Kensington. He was twice classical examiner to London University, and for the classical tripos at Cambridge. He edited *Æschylus* with Latin notes; as well as *Euripides*, *Hesiod*, the *Iliad* and others of the Greek classics. He published prose translations of the *Philebus* and *Theætetus* of Plato, portions of Aristotle's *Ethics*, the *Odes* of Pindar and the *Tragedies* of *Æschylus*, and renderings in verse of the fifth book of *Propertius* and *Fragments of the Greek Comic Poets*. He died Dec. 9, 1888.

PALFREY, **JOHN GORHAM**, an American author; born in Boston, May 2, 1796. He studied theology, and succeeded Edward Everett as pastor of the Brattle Street Unitarian Church. In 1830 he resigned, to become professor of sacred literature at Harvard College. He left there in 1839; was in the state legislature (1842-43); secretary of state, (1844-48); member of Congress (1849), and post-master of Boston (1861-67). He also was a delegate to the anti-slavery congress in Paris. He edited the *North American Review* (1835-43), and was active in literary work throughout his life. Perhaps his best-known work is *History of New England* (4 vols., 1872-73); besides which, he was author of *The Relation between Judaism and Christianity* (1854); and other books. He died in Cambridge, Massachusetts, April 26, 1881.

PALGRAVE, **FRANCIS TURNER**, an English poet, eldest son of Sir Francis Palgrave; born Sept. 28, 1824; was educated at the Charterhouse and at Balliol College, Oxford, where he took his degree of M.A., and was elected to a fellowship at Exeter College. Mr. Palgrave was created an honorary LL.D. of Edinburgh in 1878. On the death of Principal Shairp in 1886, Mr. Palgrave was elected professor of poetry at Oxford. Among his works are *Lyrical Poems* (1871); *Idyls and Songs* (1854); *Essays on Art* (1866); and a *Life of Sir Walter Scott*. He is, however, best known as the editor of *The Golden Treasury of English Songs and Lyrics* (1861), one of the best collections, in compact form, of English verse; of the *Children's Treasury of English Song* (1864); and of the *Treasury of Sacred Song* (1884); of *Shakespeare's Lyrics* (1879); *Tennyson's Lyrical Poems* (1885); *Selections from Wordsworth* (1865); and a *Selection from the Lyrical Poems of Robert Herrick* (1877). He died in London, Oct. 24, 1897.

PALGRAVE, **WILLIAM GIFFORD**, an English author and traveler, brother of the preceding; born in Westminster, London, Jan. 24, 1826. He was educated at the Charterhouse School and Trinity College, Oxford, graduating in 1846. Next year he obtained a commission in the Bombay native infantry, which, however, he soon resigned to become a priest in the Society of Jesus. After a course of study at Laval, in France and at Rome, he was sent

at his own request as a missionary to Syria, where he acquired an intimate knowledge of Arabic. Summoned to France in 1860 by Napoleon III to give an account of the Syrian massacres, he went disguised as a physician on a daring expedition at the Emperor's expense through central Arabia, traversing the entire Wahahi kingdom, and returning to Europe through Bagdad and Aleppo. With the consent of the Emperor he published his *Narratives of a Year's Journey through Central and Eastern Arabia*, one of the best books of travels in the English language. Palgrave quitted the Society of Jesus in 1864, and was sent by the British government in 1865 to treat for the release of Consul Cameron and the other captives in Abyssinia. He was nominated consul to Sukhum-Kalé in 1866; at Trebizond in 1867; at the island of St. Thomas in 1873; at Manila in 1876, and consul-general in the principality of Bulgaria in 1878, and in Siam in 1880. He was appointed British Minister to Uruguay in 1884, and died in Montevideo, Sept. 30, 1888. Among his works are *Essays on Eastern Questions* (1872); *Hermann Agha* (1872); *Ulysses: or, Scenes and Studies in Many Lands* (1887).

PALIKAO, a place on the canal between Peking and its port, Tientsin, on the Peiho. Here, Sept. 21, 1860, a victory was gained by the Anglo-French troops over the Chinese, and hence the French general, Cousin-Montauban (1796-1878), who was Minister of War in August and September, 1870, received his title of Count Palikao.

PALISADES OF THE HUDSON, a name applied to an escarpment of roughly columnar basaltic trap forming the western wall of the Hudson River for a distance of nearly twenty miles, extending through Rockland County, New York, and Bergen and Hudson counties, New Jersey. This ridge is formed of trap-rock, which in a molten condition, in the Triassic period, gushed forth from between the layers of sandstone and shale belonging to the Newark system. The palisades vary in height from 350 feet, half a mile above Fort Lee, to 550 near their northern end at Indian Head, directly opposite Hastings. The front of the cliff is everywhere precipitous, there being but three breaks sufficiently large to admit of wagon-roads reaching the river. A road runs along the top of the ridge for some distance, and on the inner, or side away from the river, the descent is very rapid into a valley dividing the Palisades from Bergen Ridge.

PALISSOT DE MONTENOY, CHARLES, a French author; born in Nancy, France, Jan. 3, 1730. He was a precocious student, and, deciding to engage in literature, left the Congregation of the Oratory, of which he was a member. He wrote various comedies and tragedies, but attracted little attention until he began to write scurrilous attacks on the philosophers. He satirized Rousseau in the comedy *Le Cercle* (1755); and Diderot in *Petites Lettres Contre des Grands Philosophes* (1756). His greatest notoriety was gained from his comedy, *Les Philosophes* (1760). Morellet (q.v., Vol. XVI, p. 821) wrote a bright and biting answer to this play, in resentment for which, Palissot, upon a charge of libel, succeeded in having him sent for

a brief sojourn to the Bastille. He died June 15, 1814.

PALIURUS, a genus of trees and shrubs of the family *Rhamnaceæ*, nearly allied to the genus *Zizyphus* but very different in the fruit, which is dry, orbicular and with a broad, membranous wing. *P. aculeatus* is often called Christ's Thorn, from the fancy that it supplied the crown of thorns with which our Saviour was crowned. It is a deciduous shrub or low tree, with slender, pliant branches and ovate three-nerved leaves, each of which has two sharp spines at the base, one straight and the other recurved. It is a native of the countries around the Mediterranean, of India and many parts of Asia. It is often used for hedges in Italy and other countries.

PALK STRAIT, a channel between India and northern Ceylon, connecting Palk Gulf and the Sea of Bengal. At its narrowest point it is 40 miles across. It was named by the Dutch after a governor of Ceylon.

PALLADIUM, a metal. See PLATINUM, Vol. XIX, p. 193; also CHEMISTRY, Vol. V, pp. 536, 537.

PALLICE, LA, a harbor opened in 1889 to receive large Transatlantic and other ocean-going vessels bound for La Rochelle in France, whence it is less than three miles distant. It consists of an inner basin, 28½ acres in extent, and an outer harbor protected by two moles, each 1,380 feet long.

PALLISER, SIR WILLIAM, a British soldier and inventor; born in Dublin, June 18, 1830; entered the army as a cavalry officer, and in 1863 invented the chilled shot that bears his name, and a system of strengthening cast-iron ordnance by the insertion of a steel tube. He retired in 1871; sat in Parliament for Taunton, and was knighted Jan. 21, 1873. He died Feb. 4, 1882.

PALMA, one of the CANARY ISLANDS, Vol. IV, pp. 795, 799.

PALMA RICARDO, a Peruvian author, born in 1833. See PERU, Vol. XVIII, p. 676.

PALMAS, CAPE, a high point of land marked by a lighthouse; forming the southern extremity of Liberia on the west coast of Africa; situated in lat. 4° 22' N. and long. 7° 44' W. The name is popularly used in reference to the region included under the Liberian state of Maryland.

PALMER, a township in Hampden County, southwestern Massachusetts, 15 miles N.E. of Springfield, on the Chicopee, Swift and Ware rivers, and on the Boston and Albany and the Vermont Central railroads. It comprises the villages of Palmer, Three Rivers, Thorndike, Bondsville and Duckville, of which the first two are the largest and most important. The township is noted for its manufacturing establishments, there being at Palmer a woolen-mill, yarn-mill, carpet factory, wire-mill and foundry; at Three Rivers a cotton-mill employing over 600 hands and producing annually 9,000,000 yards of cloth; at Thorndike, two mills making plain and fancy tickings and employing 600 hands; and at Bondsville, a mill producing annually 5,000,000 yards of duck and flannel. The village of Palmer has five churches, a weekly newspaper, two banks—national and savings—water-

works, electric lights and fire department. Population 1890, 6,520; 1895, 6,858.

PALMER, ALICE FREEMAN, an American educator; born in Colesville, Broome County, New York,



ALICE FREEMAN PALMER.

Feb. 21, 1855. She was educated at the University of Michigan, graduating in 1876, and received the appointment of instructor in Latin, Greek and mathematics at Geneva Lake, Wisconsin. In 1877 she became principal of the High School at East Saginaw, Michigan, remaining there until, in 1879, she received the appointment of professor of history in Wellesley College. In 1881 she became acting president of that institution, and in 1882, president. The University of Michigan conferred the degree of Ph.D. upon her in 1882, and she received that of doctor of letters from Columbia in 1887. She resigned in 1887, and was married to Professor George H. Palmer of Harvard in December of that year.

PALMER, ANTHONY, an American colonial governor; born about 1670. He bought a large estate near Philadelphia, and laid out part of his land in plots, and called the town Kensington. It is now the manufacturing center of Philadelphia. In 1708 he became a member of the provincial council of Pennsylvania, and was its president. When Lieutenant-Governor Thomas resigned, Palmer became acting-governor of the province for two years, during which he put the fortifications on Delaware River into a more efficient condition. For years he served as one of the judges of the court of common pleas. He died in Philadelphia, in 1749.

PALMER, BENJAMIN MORGAN, an American clergyman; born in Charleston, South Carolina, Jan. 25, 1818; educated at the University of Georgia, and the Columbus (Georgia) Theological School. After 1841 he occupied successively pulpits of the First Presbyterian Churches at Savannah, Georgia; Columbia, South Carolina; and New Orleans, Louisiana. The latter place he filled after 1856. Dr. Palmer was commissioner to ten General Assemblies; from 1853 to 1856 he was professor of church history in the Columbia (South Carolina) Theological Seminary; and in 1861 was moderator of the first Southern Assembly, at Augusta, Georgia. He was a founder and editor of *The Southern Presbyterian Review*, and published several theological works.

PALMER, SIR CHARLES MARK, an English ship-builder and coal-miner; born in South Shields, in 1822, and educated at a private school. After preparing for a commercial career he entered into partnership with his father, who was a merchant of Newcastle, and others in coal-mining and coke-making, extending the business from small beginnings until the production amounted to 1,750,000 tons per annum. Mr. Palmer introduced the use of steam collier-vessels for the transportation of coal, which have entirely superseded the old sailing-vessels. He also established the ship-yard at Jarrow,

where, in 1852, was launched the first screw collier, the *John Bowes*. After that he developed the works into what is now Palmer's Shipbuilding and Iron Company, Limited, where ocean vessels are built from the ore of its own mines, and carried through all stages, from the raw material to the finished vessel. The modern town of Jarrow sprang from these works. Mr. Palmer held many public positions of honor and trust; was elected in 1874 a Liberal member of Parliament, and was three times returned. He was made a baronet in 1886.

PALMER, ERASTUS DOW, an American sculptor; born in Pompey, New York, April 2, 1817. He was in early life a carpenter, and later a successful cutter of cameos. He turned his attention to sculpture about 1852, and produced many fine mythological and allegorical groups. His more notable works include *The Indian Captive*, representing the dawn of Christianity on the savage mind; *The White Slave*; *Spring*; *The Angel at the Sepulchre*; *The Infant Flora*; *The Emigrant's Children*; and *The Landing of the Pilgrims*. Palmer acquired his knowledge of art and technical skill in his native state, but in 1873, when he had long been famous, he visited Italy and France. In 1873-74, in Paris, he executed a statue of Robert R. Livingston, which was placed in the old Hall of Representatives at Washington in 1875. It received a medal of the first class at the Centennial Exhibition (1876).

PALMER, JAMES CROXALL, an American surgeon; born in Baltimore, Maryland, in 1811. He studied medicine at the University of Maryland, and was commissioned surgeon in 1842. During the Mexican War he served off the coast of Mexico, and on the steam frigate *Niagara* during the first attempt to lay the Atlantic cable. On the latter occasion he originated a plan for splicing the wire in mid-ocean. In 1863 he joined Admiral Farragut's blockading squadron. He was attached to the flagship *Hartford* during the battle of Mobile Bay, Aug. 5, 1864. At the close of the war Dr. Palmer returned to the North. In June, 1872, he became surgeon-general of the navy, but retired a year later. He died at Washington, District of Columbia, in 1883.

PALMER, JOHN MCCAULEY, an American public man; born in Scott County, Kentucky, Sept. 13, 1817; removed to Illinois, and was admitted to the bar in 1840. He served in the state senate, and in 1860 was a Republican Presidential elector. In April, 1861, he was appointed colonel of an Illinois volunteer regiment, served at Island No. 10, Stone River and Chickamauga, and was promoted major-general of volunteers. He led the Fourteenth Army Corps through the Atlanta campaign, May till September, 1864. From 1869 until 1873 he served as governor of Illinois. Later he became a Democrat,



GEN. J. M. PALMER.

and in 1891 was elected United States Senator from Illinois. In 1896 he was the Presidential candidate of the National Democratic party, or "Gold Democrats," who repudiated the platform which had been adopted at the convention held by the "Silver Democrats" in Chicago.

PALMER, JOHN WILLIAMSON, an American physician and author; born in Baltimore, April 4, 1825. He studied medicine in Philadelphia; went to California; thence to China; was active in the cause of the Southern Confederacy, and became an editor in his native city. In 1855 he married Henrietta Lee, author of the *Heroines of Shakespeare*. He wrote and translated many novels and plays, but is best known for his works on East Indian manners and customs, including *The Golden Dagon, or Up and Down the Irrawaddi* (New York, 1853); *The New and the Old, or California and India in Romantic Aspects* (1859).

PALMER, RAY, an American theologian and hymnologist; born in Little Compton, Rhode Island, Nov. 12, 1808. He graduated at Yale in 1830, was licensed to preach as a Congregationalist in 1832, and was pastor of the Central Congregational Church at Bath, Maine, from 1835 to 1850, when he was called to the First Congregational Church, Albany, New York. In 1852 the degree of D.D. was conferred upon him by Union College. He was appointed secretary of the Congregational Union in New York City in 1866, which office he held for 12 years. His hymns and sacred poems have attracted world-wide attention, and one among them, *My Faith Looks Up to Thee*, has been translated into more than twenty languages. He died in Newark, New Jersey, March 29, 1887.

PALMER, ROUNDELL. See SELBORNE, in these Supplements.

PALMER, THOMAS WITHERELL, an American merchant and statesman; born in Detroit, Michigan, Jan. 25, 1830; was educated at the University of Michigan, and engaged in the real-estate and lumber trade. He served in the state senate in 1878; was defeated for Congress in 1876, and in 1883 became United States Senator. Afterward he served as minister to Spain. In June, 1890, Mr. Palmer was elected president of the national commission having charge of the World's Fair in 1893.

PALMETTO, a common name given to certain palms of the southern United States, notably *Sabal Palmetto*, the cabbage palmetto; *S. serrulata*, the saw palmetto, with spiny-margined petioles; *S. Andansonii*, the dwarf palmetto; and *Chamaerops hystrix*, the blue palmetto. The first is a tree, and the southern palmetto of ordinary reference; the others are low forms.

PALMIERI, LUIGI, an Italian meteorologist; born in Faicchio, Benevento, April 22, 1807. He studied in Naples and Cajarro, and was successively professor of mathematics at Salerno, Campabosso and Avellino; became professor of physics in the Naples Royal Naval School in 1845; in 1847 was appointed professor in the University of Naples; and in 1854 became director of the Meteorological Observatory on Mt. Vesuvius. This observatory is situated on a ledge of rock running out from the

foot of the crater of the volcano, at an altitude of 1,970 feet above sea-level. There Palmieri lived for over forty years, at times incurring great personal risk, as in the great eruption of 1872, when, warned by him, the inhabitants of neighboring villages escaped for their lives. He remained at his post, the thermometer registering 130° and the sulphur fumes so heavy that breathing was next to impossible. He became so familiar with the volcano that he was able to predict every eruption. In order to take more accurate observations, he from time to time invented instruments to aid him in his task, among them one for the study of the variations in the amount and kind of atmospheric electricity, and another the electrical seismograph. His reports of observations are of great value to science, and that which embodies an account of the eruption of 1872 is highly interesting. He died in Rome, Sept. 10, 1896.

PALMISTRY or CHIROMANCY, the pretended art of discovering human character and divining personal history by a fanciful interpretation of certain varying lines and irregularities found upon the palm of the hand, usually the left. Aristotle regarded it as a science worthy of approbation; the Emperor Augustus practiced it, and the art was sanctioned by the early and mediæval Church; while its great antiquity is proven by the records of Brahmans in India. The important features of the palm upon the character of which divination is founded are: (1) *The line of life*, curving from the basal joint of the forefinger round the ball of the thumb as far as the wrist-joint. When regular and deeply colored, this line indicates a long and "happy" life, subject to such modifications as are foretold by cross-markings and connected furrows; (2) *the line of health*, running across the hand; (3) *the line of fortune*, from the forefinger to the little finger, it being important that these markings should be clear and unbroken; (4) the fleshy projection at the base of the thumb, technically called the *mountain of Venus*; (5) that at the base of the forefinger, the *mountain of Jupiter*; (6) of the middle finger, the *mountain of Saturn*; (7) of the ring finger, *mountain of the Sun*; and (8) of the little finger, *mountain of Mercury*—all indicating various dispositions and traits of character according to their respective prominence. Even the markings of the finger-nails are supposed to possess an occult significance, and certain minute lines above the finger-joints are made to augur the most fantastic destinies. The votaries of the art have sought to elevate it to the rank of an exact science; but, save among the gypsies and their dupes, this method of divination is now properly relegated to the obscurity to which other vagaries of mediævalism have been consigned.

PALMITIC ACID, occurs as a glyceryl compound in a large number of fats and oils. Is a solid at ordinary temperatures, insoluble in water, but may be dissolved in boiling alcohol or ether. Along with stearic acid it forms the bulk of the so-called "stearine" candles.

PALM-OIL, a heavy oil, mostly obtained for commerce from certain African species, and exten-

sively used in the arts for soap, candles, glycerine, etc.

PALM-SUGAR OR JAGGERY. See **SUGAR**, Vol. XXII, p. 628.

PALM-WINE, a fermented drink prepared from the sap of certain species of palm. A more powerful drink called *arrack* is derived from the palm-wine by distillation. Palm-wine is made in South America, in India and various other portions of Asia, and throughout Africa.

PALMYRA, a city and the capital of Marion County, northeastern Missouri, five miles W. of the Mississippi River and 15 miles N.W. of Hannibal, on the Chicago, Burlington and Quincy railroad. It is an important agricultural center, contains a pork-packing establishment and manufactories of flour, carriages, brick and pottery, and is the seat of a number of educational institutions, including the Centenary High School (Methodist Episcopal South), opened in 1884; St. Paul's College (Protestant Episcopal), opened in 1848 as Ingleside Female College; and a Roman Catholic institution (St. Joseph's College), opened in 1879. Population 1890, 2,515.

PALMYRA, a village of Wayne County, northwestern New York, 22 miles E.S.E. of Rochester, on the Erie canal and on the New York Central and Hudson River and the West Shore railroads. It manufactures printing-presses, scales, grain-drills, has furnaces and a machine-shop, is an important trade-center, and contains the Palmyra Classical Union School, and a bank with a capital of \$1,000,000. Population 1890, 2,131.

PALMYRA PALM, a name given to *Borassus flabelliformis*, an Asiatic palm, whose sugar-containing sap is one of the palm-wines from which *arrack* is distilled.

PALO ALTO, a town of Santa Clara County, western California, 34 miles S.S.E. of San Francisco, and 16 miles N.W. of San José, the seat of a university founded at an immense cost by United States Senator Stanford, of California, and named in memory of his deceased son, The Leland Stanford, Junior, University, (q.v., in these Supplements). A quadrangle of beautiful college-buildings has been erected here, and sites have been furnished for residences, hotels, etc., auxiliary to the great institution, besides lands for its support, comprising an area of 8,400 acres. Population 1894, estimated 1,500.

PALO ALTO, a battle-field, about 9 miles N.E. of Matamoras, Texas. Here, on May 8, 1846, 60,000 Mexicans, under General Arista, were defeated by 2,000 Americans under General Taylor. The losses in the battle have been variously stated, but were light on both sides.

PALOLO, an annelid. See **POLYNESIA**, Vol. XIX, p. 420.

PALPITATION OF THE HEART. See **HEART**, Vol. XI, p. 554.

PAMIR PLATEAU. See **TURKESTAN**, Vol. XXIII, p. 633; also **ASIA**, Vol. II, p. 686.

PAMLICO SOUND, a shallow body of water, some 75 miles long from northeast to southwest, with an extreme width of 25 miles and an average width

of about 20 miles, on the coast of North Carolina, separated from the ocean by long, narrow islands of sand, with narrow passages. The northeastern part is connected with Albemarle Sound through Croatan Sound, and is reached by vessels from the open sea through Ocracoke and Hatteras inlets. The shores of the sound are low, and the Neuse, Pamlico and other rivers flow into it.

PAMPAS. See **AMERICA**, Vol. I, p. 713.

PAMPAS-GRASS. See *Gynerium*, under **HORTICULTURE**, Vol. XII, p. 251.

PANA, a city of Christian County, southern central Illinois, 42 miles S.E. of Springfield and 35 miles S.W. of Decatur, on the Illinois Central, the Baltimore and Ohio Southwestern and the Cleveland, Cincinnati, Chicago and St. Louis railways. It is situated in a mining region, is an important center of trade, and has railroad car-shops, planing and flour mills, grain-elevators, several churches, banks, two daily and two weekly newspapers. Population 1890, 5,077.

PANAMA, ISTHMUS OF, a department of Colombia; Panama, its capital city. See **PANAMA**, Vol. XVIII, pp. 208, 209.

PANAMA CANAL. In May, 1879, an international congress was convened in Paris by M. Ferdinand de Lesseps, to discuss the plan of cutting a canal through the Isthmus of Panama. A plan previously prepared by M. de Lesseps was adopted, and a concession from the United States of Colombia to Lieutenant Lucien Napoleon Bonaparte Wyse, of the French navy, who had made a hasty and partial survey, was sold to the prospective Panama Canal Company. On Feb. 28, 1881, the first detachment of canal employees arrived at Colon; surveys were at once made, and the building of camps, hospitals, etc., followed. In 1882 the Canal Company purchased the Panama railway. De Lesseps' Engineering Commission to Panama in 1880 estimated that a canal could be made for 843,000,000 francs. De Lesseps reduced their figures to 600,000,000 francs, or \$120,000,000, and announced that a *canal à niveau*, or tide-level canal, could be completed for that sum. Later, he invited delegates to meet him at Panama in 1888 for its opening. Loans followed year after year. Meantime, interest-charges accumulated and became burdensome, while little real progress was made. In the autumn of 1888 further borrowing became impossible. The company was forced into liquidation, Jan. 1, 1889; its bond and share indebtedness was roughly estimated at \$350,000,000, interest-charges over \$20,000,000, with perhaps a fifth of the real work done. There are over 800,000 holders of shares in France. Shortly after the crash, a liquidator was named by the Court of the Seine. In 1890 a commission of French and other engineers was sent to the Isthmus by him. Their report was very discouraging. A valuable plant estimated at about \$30,000,000 was rusting away, much already useless. The tide-level cut at Colon was rapidly filling in, and the fine harbor shallowing, owing to the cut. In 1891 the government of Colombia granted to the Panama Canal company an extension of ten years from 1893 in which to finish their contract, provided oper-

ations should be resumed before February, 1893.

In November, 1892, a member of the French legislature, M. Delahaye, created a sensation in Paris by declaring that the Panama Canal Company had obtained exceptional privileges, which it had used for the purpose of defrauding the investors, by the bribery of no fewer than one hundred deputies. The government had already decided to prosecute M. de Lesseps and the rest of the directors of the Canal Company. The ministry allowed the whole question to be submitted to a parliamentary committee. Baron Reinach, a banker accused of being the instrument or agent of much of the corruption of the Canal Company, opportunely died, and it was alleged that he had poisoned himself.

Amid much popular clamor the investigation was carried on, and soon it was shown beyond doubt that the Canal Company was a gigantic fraud. Three or four hundred millions of dollars had been sunk in the attempt to cut a ship canal through a mountain range shaken with earthquakes and crossed by a devastating torrent. That the Panama Canal Company bribed deputies as well as journalists, is a fact that was settled beyond doubt. In February, 1893, M. de Lesseps, his son Charles, and other of their colleagues, were sentenced for fraud and bribery to various terms of imprisonment. The elder de Lesseps, however, was not imprisoned, and his death took place on November 7th of the following year. At the end of 1893 the only prominent person left in prison as the result of the Panama prosecutions was M. Baihaut, formerly Minister of Public Works. In 1894 a prominent engineer proffered a scheme by means of which he claimed the work could be completed in four years, at an additional cost of \$110,000,000. In September, 1894, a new issue of stock, 300,000 shares, was made. The first meeting of the new Panama Canal Company was held October 4th. Since then work has again been done on the canal. Early in 1895 a strike occurred among the laborers on the isthmus, and the company was severely criticised by the stockholders, who still hope to see some fruit for all their expenditure and anxiety. See also PANAMA, Vol. XVIII, p. 209.

PAN-AMERICAN CONGRESS. The idea of a congress or conference of representatives of the American republics originated in a plan of Henry Clay for a Panama congress, but no steps were taken to bring it about. The convening of such a congress in 1889 was owing to the efforts of James G. Blaine. This conference was meant to include representatives of the republics of the United States, Mexico, Central and South America, Haiti and Santo Domingo, and the Empire of Brazil. It was planned for the purpose of discussing and recommending means of enlarging and regulating business relations, better facilities for communication, and closer relations in matters of international exchange and reciprocity. In conformity with the provisions of an act of the United States Congress of May 24, 1888, the representatives met in Washington, Oct. 2, 1889, but adjourned to November 19th of the same year for the purpose of visiting various portions of

the United States before commencing their work. The congress continued without final adjournment for five months, and voted to recommend to the various governments for adoption, among other measures, a uniform commercial coinage, a general plan of legalizing documents, a uniform system of weights and measures, and that all the represented states adopt treaties of reciprocity. Many other subjects were discussed without definite result; among which were the question of an international bank, an extradition treaty, subsidies to steamship companies, and the protection of patents and copyrights. The congress adjourned April 19, 1890.

PANAS, PHOTINOS, a French ophthalmologist; born in Cephalonia, Ionian Islands, Jan. 30, 1832. He settled in Paris; was naturalized as a citizen, and graduated at the School of Medicine in 1860. He was made associate professor and surgeon to the Central Bureau in 1863; and between this period and 1879 was successively appointed ophthalmic surgeon to the Bicêtre Hospital, the Lourcine, the Midi, the St. Antoine, the St. Louis and the Hôtel Dieu. In 1873 he received the decoration of the Legion of Honor. He published many papers and several books, among which are *Leçons sur le Strabisme, les Paralysies Oculaires* (Paris, 1873) and *Leçons sur les Rétinites* (1878).

PANCHATANTRA, a collection of very ancient Sanskrit fables, which, having been translated into other languages, have been adopted by modern fabulists. See SANSKRIT, Vol. XXI, p. 287.

PANCOAST, JOSEPH, an American surgeon; born in Burlington County, New Jersey, in 1805. He graduated from the medical department of the University of Pennsylvania in 1828; and in 1831 was instructor in practical surgery in the same institution. Beginning in 1834, he was for 11 years connected with Blockley Hospital, and was also, during the greater part of the same period, professor of surgery in the Jefferson Medical College, exchanging this position for that of professor of anatomy in 1847. He served in this capacity until 1874. He was the author of many innovations in surgery, having succeeded in the formation of a nose by means of plastic sutures in 1841; the formation of eyebrows with strips of scalp; treatment of soft cataract with a fine bent needle; and of restoring the voice by operating upon the soft palate. He contributed to the *American Journal of Medical Sciences*, the *Medical Examiner* and the *Medical Intelligencer*. Among his writings are *Treatise on the Structure, Functions and Diseases of the Human Sympathetic Nerve* (1831); and *Treatise on Operative Surgery* (1844).—WILLIAM HENRY, his son, was born in Philadelphia, Oct. 16, 1835; graduated at the Jefferson Medical College in 1856, and afterward studied for three years in Paris, Vienna and London. He became famous for the unflinching success and the swiftness of his surgical operations. During the Civil War he was a surgeon in the army, and in 1874 took his father's place as professor of anatomy in Jefferson Medical College. He became professor in the Philadelphia Medico-Chirurgical College in 1886, and for years occupied a place of unusual eminence and repute among surgeons.

PANCREAS. See NUTRITION, Vol. XVII, pp. 674-677.

PANCREATINE. See FERMENTATION, Vol. IX, p. 96.

PANDA. See *Ailurus*, under MAMMALIA, Vol. XV, p. 441.

PANDECTS OF JUSTINIAN, a digest of Roman law. See JUSTINIAN, Vol. XIII, pp. 793, 794.

PANDORA, a Grecian myth. See ADAM, Vol. I, p. 137.

PANEL SYSTEM. See COAL-MINING, in these Supplements.

PANGENESIS, a theory of reproduction. See BIOLOGY, Vol. III, p. 690.

PANGUITCH, a post precinct and the capital of Garfield County, south southwestern Utah, on Panguitch Creek, a west branch of the Sevier River, about 130 miles S. of Nephi. It is situated in a mountainous region, with fertile valleys. Coal and an abundance of timber are found. Agricultural and dairy products are plentiful. The village has a tannery. Population 1890, 1,015.

PANICALE, an Italian painter. See MASOLINO DA PANICALE, Vol. XV, p. 610.

PANICS. (For a general understanding of financial crises throughout the world, see BANKING, Vol. III, pp. 319, et seq.). In the United States there have been two or more panics within recent years which were remarkable, not less for certain points of similarity in some of the causes which produced them and in their widespread effects, than for certain other deep-seated elements which mark them as distinctly different in kind.

The panic of Sept. 18, 1873, known as "Black Friday," was mainly a financial one, being a logical outcome of a long period of overtrading, excessive speculation and unwarranted expansion in certain lines of development. The conditions were, moreover, strongly influenced by a depreciated and fluctuating paper currency, concerning which there had been no authoritative assurance of ultimate redemption in coin. The crisis was immediately precipitated by the failure of Jay Cooke and Company, and within a brief period a great proportion of the banks suspended, premium rates for loans advanced enormously, and there was a disruption of the conditions of exchange between different sections, which was long continued. The Redemption Act of Jan. 7, 1875, restored confidence in monetary conditions, and the commercial prosperity during the ensuing 15 years was unexampled. In 1893 a panic came on, which was marked by peculiar features. The state of productive industry seemed at its highest; crops were bountiful; nature had withheld all such disasters as pestilence, famine and fire, nor was the country threatened with war or internal dissensions. The conditions changed within the space of a few weeks; and the monetary stringency and industrial depression which spread over the land were characterized by more disastrous and lasting effects than any hitherto known. In July the decrease in the volume of trade in New York was 15 per cent. In August and September it was nearly thirty per cent; and bank failures and the suspension of commercial houses were of almost daily occurrence. The short-

age of payments, as shown by the clearing-houses, was nearly three billion dollars in excess of that for the same quarter in 1892. Before the end of September upward of fifty per cent of the mills and factories in the production of cotton, woolen, leather and knit-goods, pig-iron and other products were closed; and these conditions had undergone little relaxation—if, indeed, they were not intensified—up to the beginning of November, 1896. In the matter of money scarcity, however, the conditions during this period were variable. During July and August of 1893 fully one tenth of the deposits of all banks was withdrawn in the form of bills and hidden away, and the result was a currency-panic. Premiums as high as \$25 per thousand were offered by money-brokers in exchange for small bills, and even the Chemical National Bank of New York was unable to furnish the New York Central railroad with the money for its monthly pay-roll. This incident was only one among thousands of a similar nature. In a short time, however, the high premium on currency brought it from its hiding-places, so that early in September it had dropped to one per cent, and soon disappeared entirely. Subsequently there was no real scarcity of money, but in view of the fact that industrial conditions exhibited no tendency toward a healthy improvement, the conservative banks restricted the amount of their loans and made the conditions of security so much more exacting that cash continued to be difficult to obtain.

The cause, or causes, of this period of depression were disputed. But among the more thoughtful students of the situation, there was little difficulty in forming a decided opinion. Similar to the conditions of 1873, speculation had gone to unwarranted lengths; and investments in improvements such as new railroads, Western town and land schemes, and unremunerative projects of all sorts, served to create timidity in many centers.

The people were going at too rapid a pace; and a check sooner or later was inevitable. Added to this was the growing doubt and uncertainty as to what would be the policy of the government in relation to the questions of coinage and the standard of value. Public attention became focused upon the matter in 1893, during the long fight in Congress over the repeal of the silver-purchase clause of the Sherman Bill. The agitation continued, however, and culminated in 1896 in the transformation of the Democratic party into a party whose principal aim was the free coinage of silver at the ratio of 16 to 1. Public credit was at its lowest ebb, and resulted in unparalleled commercial and industrial depression, which condition prevailed until after the election on November 3d. When it was known that the Presidential candidate of the Republican party had been elected, the alteration in the situation was surprising. Not only the nature of the change, but the degree and emphasis of it were marked features. Mills and factories which had been closed down for months, through sheer timidity as to the outcome, started up within a day after the election, with increased numbers of operatives, and prepared to run night and day, that they might complete extensive orders for goods which had been contingent upon

the turn of the election. Money came from its hiding-places, to be deposited in banks, and a much better feeling of confidence prevailed nearly all industrial and financial centers. Within the first week, it was said, more men were actively employed—by over a million in number—than had been at work in the previous week, or for a considerable period. Early in 1897 a slight relapse was felt.

PANINI, a Sanskrit grammarian. The date and place of his birth are not known certainly, but it is supposed that his native place was Calātura, near Attock, on the Indus, and that he lived in the latter part of the third or first part of the fourth century B.C. His work seems to have been the highest authority in molding the language of the later Sanskrit literature. See SANSKRIT, Vol. XXI, p. 292.

PANMIXIA and AMPHIMIXIS. See HEREDITY, in these Supplements.

PANOPOLIS, a city of ancient Greece. See EKHMIN, Vol. VII, p. 794.

PANORMUS, same as PALERMO. Vol. XVIII, p. 168.

PANORPIDÆ, scorpion-flies. See INSECTS, Vol. XIII, p. 151.

PANTELEGRAPH, a telegraphic apparatus for reproducing a writing or drawing at a distance. It makes use of a pendulum which carries an iron point over a picture or writing done in an insulating ink on metallic paper. The circuit is broken every time the pendulum passes over the points that are inked. This action is duplicated by a pendulum at the other end of the line, which swings over a paper prepared with a solution of yellow cyanide of potassium, and leaves blue marks corresponding to the original writing.

PANTHEON, temple. See ROME, Vol. XX, pp. 828, 829.

PANTHER. See PUMA, Vol. XX, pp. 104, 105.

PAOLA, a city and the capital of Miami County, eastern Kansas, 43 miles S.S.W. of Kansas City, Missouri, and about 70 miles E.N.E. of Emporia, on Bull Creek, a north branch of the Marais des Cygnes River, and on the Kansas City, Fort Scott and Memphis, the Missouri Pacific and the Missouri, Kansas and Texas railways. The surrounding prairies are rich in agricultural products, and in the vicinity of the city are found coal, lime, natural gas and oil. The city has carriage-shops, flour-mills, grain-elevators, several banks, two libraries and three weekly newspapers. Population 1890, 2,943; 1895, 3,009.

PAOLO VERONESE. See VERONESE, Vol. XXIV, pp. 173, 174.

PAPACY. See POPEDOM, Vol. XIX, pp. 487-510.

PAPAIN or PAPAYOTIN, a digestive agent, derived from the juice of the papaw tree (*Carica papaya*). The milky juice is slightly bitter and styptic, and free from tartness. It flows from incisions made in the bark and the green fruits; and is bottled and sent to market, either pure or with the addition of 10 to 12 per cent of alcohol to prevent fermentation. Papaine is a powerful digestive ferment. Its solubility in different fluids allows it to

be used in many pharmaceutical preparations. Attention was first called to its peculiar properties by M. Wurtz before the French Academy of Sciences in 1881.

PAPAL ELECTION. See CONCLAVE, Vol. VI, pp. 239, 240; and in these Supplements.

PAPAL STATES. See STATES OF THE CHURCH, Vol. XXII, p. 460.

PAPAYER. See HORTICULTURE, Vol. XII, p. 252.

PAPAVACEÆ, the name of the poppy family, which are herbs with milky or colored narcotic or acrid juice, a calyx which falls off when the flower opens, four to ten petals, numerous stamens and a many-seeded pod. The prominent genera are: *Papaver*, one of whose species (*P. somniferum*) yields opium; *Sanguinaria*, the common blood-root; *Argemone*, the prickly poppy of the southwestern United States and Mexico; *Eschscholtzia*, the Californian poppy, a showy plant common in cultivation; *Chelidonium*, the celandine, and *Bocconia*, an ornamental plant cultivated from China.

PAPAW, the common name (Creole origin) of species of *Asimina*, well-known shrubs of the central and southern United States, which bear dull-purple flowers preceding the leaves, and large, oblong, sweetish, pulpy fruits. They belong to the family *Anonaceæ* or custard-apples.

PAPER, wood. See PAPER, Vol. XVIII, pp. 225, 226.

PAPER—HANGINGS. See MURAL DECORATIONS, Vol. XVII, pp. 38, 39.

PAPER NAUTILUS. See CUTTLE-FISH, Vol. VI, p. 739.

PAPINEAU, LOUIS JOSEPH, a Canadian statesman; born in Montreal, in October, 1789. At 20 he was elected to the legislative assembly, and speedily worked his way to the head of the radical or French-Canadian party, and in 1815 was chosen speaker of the House of Assembly for Lower Canada, a post that he held until 1837. He opposed the union of Upper and Lower Canada, formulated the grievances and demands of his party in the 92 resolutions, and agitated actively against the imperial government. When the province rose in rebellion in 1837, a warrant was issued against Papineau for high treason, though he took no active part in the fighting. He escaped to Paris; afterward returned to Canada, and was pardoned in 1847. He died in Montebello, Quebec, Sept. 23, 1871.

PAPUA, a Malayan word signifying frizzled in reference to the hair and sometimes applied as a title to New Guinea. See NEW GUINEA, Vol. XVII, pp. 386-390; and in these Supplements.

PARÁ, a city of Brazil. See PARÁ, Vol. XVIII, p. 233; and BELEM, in the Supplements.

PARA, a coin of copper, silver or mixed metal, though most generally of copper, in use in Turkey and Egypt. It is the fortieth part of a piaster and varies much in value, owing to the debased condition of the Turkish coinage.

PARABLES. See GOSPELS, Vol. X, pp. 801, 809.

PARABOLA. See CONIC SECTIONS, Vol. VI, pp. 273-275.

PARAÇATU, a town and a river of the same

name, a western affluent of the São Francisco, in western Minas Geraes, Brazil, about 450 miles N.N.W. of Rio de Janeiro. It is the center of a region devoted to grazing and to growing coffee and sugar-cane. A considerable trade is carried on with Goyaz and Bahia. Paraçatu was formerly noted for its gold-washings, now almost exhausted. Some diamonds have also been found in the vicinity. Population, about 10,000.

PARACHUTE. See **AÉRONAUTICS**, Vol. I, pp. 200, 201.

PARACLETE or **HOLY GHOST.** See **GOSPELS**, Vol. X, pp. 838-840.

PARADISE-FISH, a Chinese species of Macro-pod, the genus *Polyacanthus*, of the acanthopterygian family *Labyrinthici*, often kept in aquaria for its beauty of form and coloring. In the male the colors increase in brilliancy at the pairing-season, and he swims around his wished-for mate, fluttering the long, delicate filaments of the ventral fins, or erecting those of the tail fin like a peacock's train in miniature.

PARADISEIDÆ. See **BIRDS OF PARADISE**, Vol. III, p. 778.

PARADOX, HYDROSTATIC. See **HYDRO-MECHANICS**, Vol. XII, p. 441.

PARADOXURUS or **PALM-CIVETS.** See **MAMMALIA**, Vol. XV, p. 436.

PARAGOULD, a town and the capital of Greene County, northeastern Arkansas, about 160 miles N.E. of Little Rock and about 10 miles W. of the St. Francis River, on the Paragould and Southeastern, St. Louis, Iron Mountain and Southern and the St. Louis Southwestern railways. It is in a region producing cotton, corn, the cereals, white and sweet potatoes, fruit, live-stock and timber; is an important shipping-point, and has large stove factories. Population 1890, 1,666.

PARAGUAY, REPUBLIC OF. (For general article, see **PARAGUAY**, Vol. XVIII, pp. 243-245.) In 1896 the area and population were estimated as follows: Area, about 98,000 square miles; population, about 400,000. There were also said to be about 125,000 Indians and upward of 10,000 foreigners of all nationalities. The population of the capital, Asuncion, was about 25,000; other towns are Villa Rica, 11,000; Concepcion, 11,000; San Pedro, 12,000; Luque, 8,000—including their districts.

Education is free and compulsory. In 1887 only 20 per cent of the Paraguayans and 60 per cent of adult foreigners could read and write. There were, in 1890, 292 public elementary schools, with 18,894 pupils. In 1887 there were only 138 schools, with 15,180 pupils. There are, besides, over 100 schools subsidized by the Council of Education, and at Asuncion there is a national college, with 15 professors and 150 students.

In Asuncion there is also a public library, and five newspapers are published in that city.

A high court of justice and various inferior tribunals, with local magistrates, exercise judicial functions.

FINANCE. The revenue of Paraguay in 1891-92 amounted to a total of \$2,731,507. Of this sum about \$1,500,000 was derived from customs, \$500,000 from

sales of land and yerbaes and \$12,653 from the rent of government lands. The expenditure amounted to \$3,829,569. The external debt on Jan. 1, 1893, was \$26,523,712. The internal debt at the same time was about \$1,400,000.

PRODUCTION AND INDUSTRY. The number of horned cattle in Paraguay in 1891 was 861,954; horses, 99,693; mules and asses, 4,621; sheep, 62,920; goats, 14,656; pigs, 10,778. Only 158,100 acres were under cultivation in 1887; viz., maize, 58,800 acres; manioca, 41,400 acres; sundries, 8,800 acres. There were about 1,200 factories, tanneries, mills and houses of business, with an aggregate working capital of \$4,550,000, giving employment to 2,600 persons.

COMMERCE. The total value of imports from all directions in 1891 was \$1,802,000, exports \$3,166,000; in 1888, imports \$3,198,168, exports \$2,183,381; in 1890, imports \$2,725,611, exports \$2,901,589. The chief imports are textiles.

The imports pass entirely through the territories of Brazil and the Argentine Confederation, and there is no direct intercourse between Paraguay and the United States or Europe.

COMMUNICATION; In 1892, 370 vessels, of 122,093 tons, entered the port of Asuncion, and 348, of 117,511 tons, cleared. In the river traffic in 1891, 989, of 17,172 tons, cleared.

There is a railway of 127 miles, now in English hands. Receipts in 1887 amounted to \$161,550, and the expenses to \$111,337; and in 1889 there were 404,777 passengers. A concession was granted in 1887 for the extension of the railway through the southern part of the Republic to the river Paraná, and another toward the Bolivian frontier. There is a line of telegraph at the side of the railway. The national telegraph connects Asuncion with Corrientes, in the Argentine Republic, and thus with the outside world. The telephone is in operation at Asuncion, with a network of 625 miles of wire. Paraguay joined the postal union in 1881.

PARAGUAY RIVER. See **BRAZIL**, Vol. IV, pp. 222, 234.

PARAGUAY TEA. See **MATE**, Vol. XV, p. 627; and **AQUIFOLIACEÆ**, in these Supplements.

PARAHYBA-DO-SUL. See **BRAZIL**, Vol. IV, p. 222.

PARALEPIDIDÆ, a family of small fishes found in the deep waters of northern seas. There are few species. They are of no economic importance.

PARALLELOGRAM. See **MENSURATION**, Vol. XVI, p. 15.

PARALLELOGRAM OF FORCES. See **MECHANICS**, Vol. XV, p. 701.

PARALLELOPIPED, a solid figure having six faces, the faces being invariably parallelograms, and any two opposite faces equal, similar and parallel. If the faces are all squares, and consequently equal, the parallelopiPED becomes a cube.

PARALLELS OF LATITUDE. See **GEOGRAPHY**, Vol. X, p. 198.

PARAMAGNETIC SUBSTANCES. See **ELECTRICITY**, § 60, in these Supplements.

PARAMATTA. See **PARRAMATTA**, Vol. XVIII, p. 321.

PARAMECIUM or SLIPPER ANIMALCULE, an infusorian common in pond-water or in vegetable infusions. In shape it is an asymmetrical oval, in length about one hundredth of an inch. Each paramecium is covered with rows of cilia, which lash it through the water and drive food-particles into an aperture which serves as a mouth. A paramecium often divides transversely into two; these two repeat the process, and rapid multiplication may thus proceed for a while. It has its limits, however, and then two individual infusorians conjugate, exchange some of the material of their micronuclei and separate, when division again ensues. Illustrations of the various stages in the life-history are given under *Ciliata*, in PROTOZOA, Vol. XIX, pp. 861-864.

PARAMETER. See CONIC SECTIONS, Vol. VI, p. 274.

PARAMITAS. See LAMAISM, Vol. XIV, p. 226.

PARANÁ, a town and the capital of the province of Entre Rios, eastern central Argentine Republic. It stands on a high bluff, forming the east bank of the Paraná, overlooking the Paraná, nearly opposite Santa Fé, 245 miles N.W. of Buenos Ayres. The town was the capital of the Confederation from 1852 to 1861; afterward it sank rapidly, but within recent years has had a marked increase in growth, and has a population of about twenty thousand.

PARANÁ, a river. See PLATE, Vol. XIX, p. 188.

PARAPET. See ARCHITECTURE, Vol. II, p. 469; and FORTIFICATION, Vol. IX, pp. 421-430.

PARAPLEGIA. See PARALYSIS, Vol. XVIII, p. 256.

PARA RIO. See BRAZIL, Vol. IV, p. 221.

PARASALENÆ or MOCK MOONS. See HALO, Vol. XI, pp. 398-400.

PARASANG. See *Persia*, in WEIGHTS AND MEASURES, Vol. XXIV, p. 490.

PARASITES. See PARASITISM, Vol. XVIII, pp. 258-271; and ECOLOGY, in these Supplements.

PARCÆ. See FATES, Vol. IX, p. 49.

PARDESSUS, JEAN MARIE (1772-1853), a French jurist. See SEA LAWS, Vol. XXI, p. 585.

PARDO, DON EMANUEL. See PERU, Vol. XVIII, p. 679.

PARDOE, JULIA, an English authoress; born in Beverley, in 1806. She published poems and a novel in her fifteenth year, and *Traits and Traditions of Portugal* in 1838. A visit to Constantinople in 1836 led to her *City of the Sultan*, after which she made other interesting journeys and published accounts of them. She died Nov. 26, 1862.

PARDON, in law, is the remission of the penalty inflicted on an offender who has been tried and convicted, and is an act of grace rather than of justice. The right should be used with great discretion in rectifying an obvious miscarriage of justice, or where, through the inevitable imperfection of all laws, individual cases or offenses seem to be visited with too severe a penalty. The power of pardoning crime is, by the constitution and laws of most of the states of the American Union, conferred upon the governors of the respective states. In the following states, however, the governor is assisted by an executive council, when the question of pardon is to be decided: Maine, Florida, Louisiana, New Hamp-

shire, New Jersey, North Carolina and Vermont. In Pennsylvania the governor grants pardons only on the recommendation of a board of pardons. In Illinois also a board of pardons is invested with the power. See also PARDON, Vol. XVIII, pp. 271, 272.

PAREGORIC or PAREGORIC ELIXIR, the compound tincture of camphor of the pharmacopeia. It consists of an alcoholic solution of opium, benzoic acid, camphor and oil of anise, every fluid ounce containing two grains each of opium and benzoic acid and one and a half grains of camphor. This preparation is much used, both by the profession and the public. It has been found useful in chronic rheumatism, and, especially in the case of children, to relieve slight pains in the stomach and bowels.

PAIREIRA-BRAVA, a lofty climbing shrub indigenous to the forests of Peru and Brazil, and bearing bunches of oval berries resembling grapes. The plant yielding the root of commerce is the *Chondrodendron tomentosum*, which has a long branching woody root, of a yellowish to a greenish brown color internally, and has attained considerable reputation in medicine.

PARELLA, a name given to some of those crustaceous lichens which are used to produce Archil, Cudbear and Litmus, but which more strictly belongs to one species, *Lecanora parella*, and the red or crimson dye prepared from it.

PARENCHYMA. See BOTANY, Vol. IV, p. 85.

PARENT AND CHILD. See INFANT, Vol. XIII, p. 1.

PAIREPA-ROSA. See ROSA, in these Supplements.

PARESIS. See PARALYSIS, Vol. XVIII, p. 256.

PARHELIA or MOCK SUNS. See HALO, Vol. XI, p. 399.

PARIA, GULF OF. See TRINIDAD, Vol. XXIII, p. 573.

PARIAH. See MADRAS, Vol. XV, p. 185.

PARIDÆ. See TIMMOUSE, Vol. XXIII, p. 419.

PARIETAL BONES. See ANATOMY, Vol. II, p. 824.

PARIETAL or PINEAL EYE. See PINEAL EYE and SENSE-ORGANS, in these Supplements.

PARIMÉ, CORDILLERA OF. See AMERICA, Vol. I, pp. 670, 671.

PARIS, CITY OF. (For general article, including map, see PARIS, Vol. XVIII, pp. 274-295.) Since the establishment of the republic the work of improving the city has gone steadily forward. New streets have been opened near the Paris Bourse de Commerce and the Post-office; the Champs de Mars, a waste of sand, has been converted into a beautiful garden, in which rises the Eiffel Tower. The museums of the Jardin des Plantes have been rebuilt; the Quartier Latin has been covered with educational buildings. May 9, 1889, the Paris Universal Exposition was opened in the Champs de Mars. It occupied an area of 173 acres, and in magnitude and comprehensiveness excelled all its predecessors. In 1890-91 two great undertakings were mooted—a system of metropolitan railways to connect the great Parisian stations with the heart of the city, and the conversion of Paris into a seaport by the deepening of the Seine or the construction of a ship-canal to the

Channel. The enthusiastic advocates of the latter scheme predict that in a few years it would make Paris the largest city in Europe and the center of the commerce of the world. No definite steps had been taken in the matter up to the summer of 1896, but its friends still hoped to complete the work in time for the opening of the World's Exposition in 1900. On the 30th of March, 1893, the new Montretout reservoirs were opened, raising the daily water-supply from 150,000 to 270,000 cubic meters. Operations were begun in 1889 for bringing to Paris the water of the river Avre, a tributary of the Eure and a stream of great purity. An aqueduct, 63 miles long, partly under ground and partly above, brings the water to St. Cloud, where a reservoir contains 400,000 cubic meters. One tunnel, at Versailles, is over four miles long. The cost has been 32,000,000 francs. To meet future needs the prefecture is now preparing for a further supply from the Loing and the Lunain.

In the census of 1891 Paris reported a population of 2,447,957.

Paris collects and disburses 250,000,000 francs annually.

	FRANCS.
Profits from various enterprises, such as markets, gas, water (which pays 12,000,000 francs), street-railways, cabs and other profitable monopolies, paid into the city treasury annually, amount to -----	40,000,000
Collected from octroi taxes-----	140,000,000
Direct taxation -----	35,000,000
Paid from National Treasury-----	35,000,000
Total -----	250,000,000

The corporations manufacturing gas must pay the city 200,000 francs a year for the privilege of piping streets, .02 franc a year for each cubic meter supplied, and half the net profit after paying 13½ per cent on the capital stock of 84,000,000 francs, which stock cannot be watered. Two hundred million francs, or \$40,000,000, was paid into the city treasury from this source alone for ten years prior to 1893.

PARIS, a town and the capital of Bear Lake County, extreme southeastern Idaho, near Bear Lake, and ten miles from Montpelier, the nearest railroad station, on the Union Pacific railroad. It is the center of an agricultural, dairying and stock-raising district. Considerable lumber is also obtained in the vicinity. Population 1890, 893.

PARIS, a city and the capital of Edgar County, eastern Illinois, 36 miles S. of Danville and 170 miles S. of Chicago, on the Cleveland, Cincinnati, Chicago and St. Louis and the Terre Haute and Indianapolis railroads. It is an important manufacturing and trade center, is the center of a rich agricultural region, contains railway car-shops, foundries, planing, saw and flour mills, two national banks with a capital of \$208,000, a new courthouse; has three daily and four weekly newspapers, and a monthly periodical, the *Anchor and Shield*, the organ of the Ancient Order of United Workmen. Population 1890, 4,996.

PARIS, a city and the capital of Bourbon County, northeastern central Kentucky, on Stoner Creek, 19 miles N.E. of Lexington and 80 miles S.E. of Covington, and on the Kentucky Midland and the

Louisville and Nashville railroads. It contains a military institute; manufactures Bourbon whisky, flour and cordage; and has large interests in tobacco and blooded live-stock. Population 1890, 4,218.

PARIS, a post town and the capital of Oxford County, western Maine, about 50 miles N.E. of Portland, on the Penobscot River, and on the Grand Trunk railroad. It contains the villages of Paris and South Paris, the former picturesquely situated on a hill about eight hundred feet high, and the latter a short distance to the south, on the railroad. There is an academy at Paris, and at South Paris a cheese factory, foundry, saw and grist mills, and the Oxford Normal Institute. Mount Mica, in the township, is remarkable for the abundance and variety of minerals which it contains. Population of town 1890, 3,156.

PARIS, a town and the capital of Monroe County, northeastern Missouri, on the middle fork of Salt River, 25 miles E. of Moberly and 44 miles W.S.W. of Hannibal, on the Missouri, Kansas and Texas railway. It has manufactories of woolen goods, furniture, flour, lumber and bricks, and is the trade center of a rich agricultural region. Population 1890, 1,487.

PARIS, a town and port of entry of Brant County, southwestern Ontario, Canada, 29 miles W. of Hamilton, on the navigable Grand River, and on the Grand Trunk railroad. It has excellent water-power, which runs woolen, flour, saw and planing mills; other industries include knitting and carpet factories and manufactories of castings and machinery. In the vicinity extensive gypsum-beds are found. Population 1891, 3,094.

PARIS, a city and the capital of Henry County, northwestern Tennessee, 70 miles W. of Clarksville and 131 miles N.E. of Memphis, on the Louisville and Nashville and the Paducah, Tennessee and Alabama railroads. It has a lucrative trade in tobacco and cotton, the surrounding country being extensively devoted to raising the former product; contains several factories and mills, and is the seat of an academy. Population 1890, 1,917.

PARIS, a city and the capital of Lamar County, northeastern Texas, 98 miles N.E. of Dallas, and 90 miles W. of Texarkana, on the Gulf, Colorado and Santa Fé, St. Louis and San Francisco and Texas Pacific railroads. It is the trade center and shipping-point of a region producing cotton, grain, fruit and live-stock; has cottonseed-oil, flour, saw and planing mills, cotton-gins and compresses, large fruit cannery, foundries, artificial ice factory, machine-shops, manufactories of furniture, plows and wagons, and other industries. The city has four state and national banks, good schools, two weekly, one semiweekly and two daily newspapers, and is the seat of the North Texas University. Population 1890, 8,254.

PARIS, a genus of plants of the family *Liliaceæ*, of which one species, *P. quadrifolia*, called herb-paris, is common in moist, shady woods in some localities. It is rarely more than a foot high, with one whorl of generally four leaves and a solitary flower on the top of the stem, followed by

a berry. The berry is reputed narcotic and poisonous, but its juice has been employed to cure inflammation of the eyes. The root has been used as an emetic.

PARIS, ALEXIS PAULINE, a French author; born in Avenay, Marne, France, March 25, 1800. He studied law, but his natural preference was for literature and history, and he acquired a knowledge of mediæval French writings which made him famous. In 1828 he became attached to the department of manuscripts in the great library, now the Bibliothèque Nationale, and became a member of the Académie des Inscriptions et Belles-Lettres in 1837. From 1853 to 1872 he was professor of French literature and language at the Collège de France, retiring in the latter year with the title of honorary professor. Among his writings are *Apologie de l'École Romantique* (1826); *Les Grandes Chroniques de France* (6 vols., 1836-38); and many other works. He died in Paris, Feb. 13, 1881.

PARIS, GASTON BRUNO PAULIN, a French philologist, son of the preceding; born in Avenay, France, Aug. 9, 1839. He graduated at the Collège Rollin, studied Romance philology in Germany, and, returning to Paris, became, in 1865, instructor in Romance languages in the École Pratique des Hautes Études. He lectured, at times, at the Collège de France in the place in his father, whom he succeeded in 1872. He contributed to the early history of French literature and language, and the school of Romance philology in France is not only composed chiefly of his pupils, but owes its existence to his efforts. He aided in founding the *Revue Critique* (1865), and the *Romania* (1872), of which he became director. Among his works are *Étude sur le Rôle de l'Accent Latin Dans la Langue Française* (1862); *Histoire Poétique de Charlemagne* (1866); *La Poésie du Moyen Âge* (1885). In May, 1896, he was chosen to the seat in the Academy made vacant by the death of Alexandre Dumas.

PARIS, COMTE DE, son of Duc d'Orléans, and grandson of King Louis Philippe; born in Paris



COMTE DE PARIS.

in 1838. He was educated in England, having left France after the overturn of the monarchy in 1848. He and his brother, the Duc de Chartres, served on the staff of General McClellan during part of the American Civil War. He married, in 1864, the eldest daughter of the Duc de Montpensier, by whom he had three children. After the death in 1885, of the Comte de Chambord, the head of the royal house of France, the Comte de Paris was acknowledged by nearly all the Legitimists as his successor. In 1886, on the passing of the Expulsion Bill, the Comte de Paris once more left for England. After his return from the United States he allied himself with the Liberals and the

Republicans against the empire, and subsequently with the Legitimists against M. Thiers. He was the author of an interesting and comprehensive work, in six volumes, on English trade unions. He visited Lisbon in 1889 on the occasion of the christening of his grandson, the infant Prince of Portugal. He died in Stowe House, Buckinghamshire, England, Sept. 8, 1894.—His son, LOUIS PHILIPPE ROBERT, the Duc d'Orléans, was born Feb. 6, 1869. He was sentenced in 1890 to two years' imprisonment for having entered French territory in order to offer himself as a private soldier in the national army. He was, however, released after a short imprisonment, and after his father's death, as claimant to the throne of France, removed to Brussels as being near France.

PARIS, DECLARATION OF. See DECLARATION OF PARIS, Vol. VII, pp. 21, 22.

PARIS, MATTHEW OF. See MATTHEW OF PARIS, Vol. XV, pp. 633, 634.

PARIS, TREATIES OF. The treaty of 1763, otherwise known as the *Peace of Paris*, was of great consequence to the people of the American continent, in that all the French possessions in North America east of the Louisiana territory were ceded to Great Britain. (For its provisions, see FRANCE, Vol. IX, p. 591.)

The treaty of 1814, which has been designated the *First Peace of Paris*, was so called because a second pacification became necessary after Napoleon's return from Elba and his one hundred days of empire. It followed after the overwhelming victory of the allied Prussians, Russians and Austrians over Napoleon at Leipsic, Oct. 16 to 19, 1813. It reduced the dimensions of France to what they were prior to 1792, and provided for the *Congress of Vienna*. (See CONGRESS, Vol. VI, pp. 270, 271.)

The treaty of 1815, called the *Second Peace of Paris*, was between France and the allies after Napoleon's final overthrow at Waterloo. It still further reduced the territorial limits of France, and provided that a foreign army should occupy French territory at the expense of France.

The treaty of 1856 is treated at length under the title DECLARATION OF PARIS, Vol. VII, pp. 21, 22. The attitude of the United States toward the provisions of this treaty should, however, be more fully stated. The United States had, in 1856, declined to become a party to the declaration, on the ground that inadequate provision was made for the security from capture of private property at sea. That government contended that a neutral flag should cover free goods—that is, that a neutral vessel should not be searched even for contraband of war. In 1861 Secretary of State William H. Seward declared to Great Britain that the United States would abide by the Declaration of Paris, provided that goods of non-combatants were secured from confiscation during maritime war. Earl Russell thereupon made the additional stipulation that such an agreement should have no "bearing,

direct or indirect, on the internal differences now prevailing in the United States."

This was a plain statement that England would accord whatever belligerent rights to the Confederacy that she might choose to do, and Mr. Seward terminated the negotiations. He had previously taken the stand that the Confederates were insurgents, and that until they had shown their capacity to maintain their independence it would be a violation of international courtesy for a foreign state to give them recognition. Not only had he declined all offers from the European nations to arbitrate our internal differences, but he had insisted that the only proper resort was for representatives of the Northern and Southern states to settle their disputes in the halls of Congress.

On Nov. 8, 1861, Captain Wilkes took four Confederate commissioners from the deck of an English steamer, and brought them to Fort Warren, in Boston harbor. This was known as the *Trent* Affair. Secretary Seward claimed that the government did not authorize this act, but declared that the existing condition of international law was such that Captain Wilkes should have brought the *Trent* as a prize before an admiralty court. He concluded, however, that, should the British government demand the prisoners, he would consent to a liberal United States interpretation of neutral maritime rights, and relinquish the prisoners, inasmuch as the United States had resisted the right of search since prior to the War of 1812. Yet this concession does not have the force of a treaty, and the United States is not bound to observe any of the terms of the Declaration of Paris, nor are foreign states bound to observe them toward her in case of war between them.

PARIS BASIN, in geology, the area in which the Cainozoic systems of France are best developed.

PARIS GREEN, a cupric aceto-arsenite powder, called also mitis-green, emerald-green, imperial-green, French green, Vienna green, Schweinfurth green, and sometimes Scheele's green, from which it differs in that it contains acetic acid. As a pigment it is fairly permanent, somewhat lacking in body, and is sparingly employed by artists and decorators for the production of a vivid light green color. As an insecticide it is very poisonous, and is extensively used in the extermination of the cotton-worm, the potato-bug and other noxious insects.

PARK, EDWARDS AMASA, an American theologian, author and educator; born in Providence, Rhode Island, Dec. 29, 1808. After graduating at Brown University and Andover Theological Seminary, he was pastor of the Braintree Congregational Church; held the chair of moral philosophy at Amherst College; and from 1836 to 1881 was a member of the faculty of Andover, first in the chair of sacred rhetoric, and afterward of Christian theology. He was for over forty years an editor of *Bibliotheca Sacra*. Among his most valuable writings are numerous

biographies of prominent Americans, including Charles S. Storrs, Joseph S. Clark and Leonard Woods. He also published numerous theological discussions, and edited several books of hymns.

PARK, ROSWELL, an American surgeon; born in Pomfret, Connecticut, May 4, 1852. He was educated at Racine College and Chicago Medical College, and from 1877 to 1882 was adjunct professor of anatomy in the latter institution. He was lecturer on surgery in Rush Medical College (1882-83); professor of surgery in the University of Buffalo after 1883; author of *Mütter Lectures on Surgical Pathology* (1892); of many surgical papers and essays; and one of the associate authors of *An American Text-Book of Surgery* (1892). He was editor of the *Chicago Weekly Medical Review*; the *Medical Press of Western New York*; and one of the editors of *Annals of Surgery*.

PARK CITY, a city of Summit County, north-eastern Utah, about 30 miles E. of Salt Lake City, on the Utah Central and the Union Pacific railroads. It is an important silver and lead-mining town, and has quartz-mills, sampling-works and saw-mills. Population 1890, 2,850; 1895, 4,491.

PARKER, a city and the capital of Turner County, southeastern South Dakota, 23 miles S.W. of Sioux Falls, on the south branch of the Vermillion River, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It is the trade center and shipping-point for a district producing barley, flax, wheat, corn, potatoes, and having large interests in cattle-raising and wool-growing. Population 1890, 728.

PARKER, FOXHALL ALEXANDER, an American naval commander and writer; born in New York City, in 1821. He graduated at the Philadelphia Naval School; served in the Florida war and in the Mediterranean; became executive officer at the Washington navy-yard in 1861; served with distinction throughout and since the war; was promoted to commander in 1862; captain in 1866; and superintendent of the United States Naval Academy in 1878. He was the author of valuable naval text-books, including *Squadron Tactics Under Steam* (1864); *Naval Howitzer Afloat* (1866); *The Fleets of the World, the Galley Period* (1877); and *The Battle of Mobile Bay* (1878); and was an entertaining miscellaneous writer. He died in 1879.

PARKER, GILBERT, a Canadian novelist; born in Quebec in 1861, and educated in Canadian and English schools, receiving his university education at Trinity College, Toronto, where, for a time, he was lecturer on English literature. At his *alma mater* he studied for the church, but falling into ill health never took orders. Instead, he made a voyage to Australia, where he became connected with the Sydney press, set forth on a voyage about the South Seas, and wrote one or two dramas. In 1890 he left the antipodes and proceeded to London, where he wrote for English magazines and weekly periodicals the series of short tales of Hudson Bay Company life in the Canadian Northwest, that were afterwards col-

lected in *Pierre and His People* (1892). The tales, which broke new ground for romance, are full of graphic writing and clever studies of half-breed and Indian character that fasten themselves on the memory and enthrall the reader. They breathe, moreover, the free, untainted air of nature's solitudes in the vast wastes of the old Hudson Bay Company domain. This work was followed successively by several sustained narratives of more or less enchaining interest, *The Trail of the Sword*; *The Trespasser*; and *The Translation of a Savage*, the latter being a London story. His next and more notable ventures were again in the field of Canadian romance, *The Seats of the Mighty*, dealing with Quebec under the French régime, and *When Valmond Came to Pontiac*, a story founded on the conspiracy of the great chief of the Ottawa tribes, who sought to undo the work of the conquest. In these later works he manifests increased strength and versatility as a novelist, and bids fair to win for himself a notable name in English fiction. Mr. Parker took up his residence in London, England.

PARKER, HORATIO WILLIAM, an American composer and organist; born in Auburndale, Massachusetts, Sept. 15, 1863. He studied music in Boston and Munich. In 1885 was produced, in Munich, his first work of importance, the cantata *King Trojan*. Other cantatas are *The Kobolds*, and *Hora Novissima* (1892), for the Church Choral Association of New York, and many other works, both sacred and secular. He was professor of music at the Cathedral School of St. Paul, Garden City, Long Island, from 1885 to 1893; was organist of Holy Trinity Church, New York; organist of Trinity Church, Boston; elected professor of the theory of music at Yale University in 1894.

PARKER, JOEL, an American jurist and soldier, born near Freehold, New Jersey, Nov. 24, 1816. He was admitted to the bar in 1842; became state legislator in 1847; major-general of volunteers in 1861; and governor of New Jersey in 1862. He served until 1866, doing much to aid the national government during the Civil War; was re-elected in 1870; was the National Labor Party candidate for Vice-President of the United States in 1872, and in 1880 was appointed a justice of the supreme court of New Jersey, being reappointed in 1887. He died in 1888.

PARKER, JOSEPH, an English clergyman and author, the son of a stonecutter; born in Hexham, April 9, 1830, and, like Spurgeon, began to preach in early youth. He was ordained pastor of the Congregational Church at Banbury, and became minister of the Cavendish Street Church, Manchester, in 1858, and of Poultry Chapel, London, in 1869, now City Temple (opened 1874). He visited the United States in 1888. He published a number of works, mainly theological; among them are *Helps to Truth-Seekers* (1857); *Ecce Deus* (1868); and *City Temple Sermons* (1869).

PARKER, WILLARD, an American surgeon; born in Lyndeboro, New Hampshire, Sept. 2, 1800. He graduated at Harvard in 1826; became a pupil of Dr. John C. Warren of Boston, and was

appointed professor of anatomy in Berkshire Medical College, Pittsfield, Massachusetts, after graduating from the Harvard Medical School in 1830. In 1836 he accepted a similar position in the Medical College of Cincinnati, and in 1839 became professor of surgery in the New York College of Physicians and Surgeons, holding this position for thirty years, when, in 1869, he took the chair of clinical surgery. He established the first college clinic in the United States; in 1854 reported the first cases of malignant pustule, and made many valuable discoveries in practical surgery, including the cure of abscess of the vermiform appendix. He became president of the New York State Inebriate Asylum in 1865; was member of many professional societies, domestic and foreign; author of many papers on practical surgery, including *Cystotomy* (1850); *Concussion of Nerves* (1856); *Lecture on Cancer* (1873). He died in New York City, April 25, 1884.

PARKER, WILLIAM KITCHEN, an English naturalist; born June 23, 1823, in Dogsthorpe, Northampton County, England; was educated at Charing Cross and King's College hospitals. He began the practice of medicine in 1849, meanwhile making an exhaustive study of botany and natural history. In 1865 he was elected a fellow of the Royal Society, and subsequently received a medal for his investigations in the osteology of vertebrates. He also was awarded annual grants from the society, and from the crown, to enable him to continue his work. In 1873 he became Hunterian professor at the Royal College of Surgeons, London. He was also fellow and honorary member of numerous other societies. Dr. Parker was not only a skilled dissector, but a keen observer and a good draftsman. He published upward of sixty papers on the vertebrate skeleton, the morphology of the skull and other subjects. Among them are *Gallinaceous Birds and Tinamous* (1862-66); *The Skull of Batrachia* (1878); *Insectivora* in the *Transactions* of the Royal Society of London (1886). He died in Cardiff, July 3, 1890.

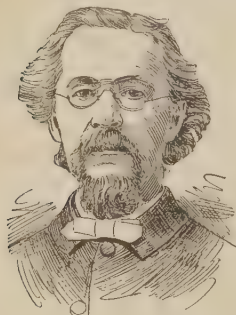
PARKERSBURG, a city of West Virginia, about 95 miles below Wheeling, and 12 miles below Marietta, Ohio, on the Baltimore and Ohio, Baltimore and Ohio Southwestern and Ohio River railroad. Parkersburg contains a courthouse, 12 churches, several high schools, 4 national banks with a combined capital of over \$600,000, gas-works, a fine new building erected by the United States for a post-office and courthouse, 5 oil-refineries, 2 large lumber-mills, 3 iron foundries, 5 machine-shops, chemical-works, boiler-shops and barrel factories. One weekly, one semiweekly and two daily newspapers are published. The city has an extensive trade in oil (petroleum), which is procured in this and adjoining counties; also a large trade in lumber, of which much is exported to England. Population 1890, 8,408. See also PARKERSBURG, Vol. XVIII, p. 301.

PARKES, SIR HENRY, an Australian statesman; born in Stoneleigh, England, in 1815. He emigrated to New South Wales in 1839, and at Sydney became eminent as a journalist, editing *The*

Empire from 1849 to 1856. A member of the Colonial Parliament in 1854, he held various government offices and became Prime Minister in 1872. He has since been several times head of the ministry, and has been identified with the promotion of free trade. He was the representative of New South Wales at the colonial conference in London in 1887, and in 1891 was president of the council for arranging a federal union of the Australian colonies. He is author of quite a number of works. His most important ones are *Australian Views of England* (1869); *Fifty Years of the Making of Australian History* (1893.) He died April 26, 1896.

PARKESBURG, a borough of Chester County, southeastern Pennsylvania, 18 miles W. of Westchester and about 55 miles S.E. of Harrisburg, on the Pennsylvania railroad. It is situated in an agricultural region, has steam flour and planing mills and an iron manufactory. Population 1890, 1,514.

PARKHURST, CHARLES H., a clergyman and social reformer of New York City; born in Framingham, Massachusetts, April 17, 1842; graduated at Amherst in 1866; studied theology at Halle in 1869, and at Leipzig in 1872 and 1873. He became president of the Amherst High School in 1867; professor in Williston Seminary, Easthampton, Massachusetts, in 1870; pastor of the Congregational church at Lenox, Massachusetts,



in 1874, whence he was called, about six years later, to the pulpit of the Madison Square Presbyterian Church, New York City. He succeeded Dr. Howard Crosby as president of the Society for the Prevention of Crime, and in that capacity made a vigorous campaign against the evil-doers by having them prosecuted and punished in spite of police indifference. In the spring of 1892 his exposure and denunciation of those in control of the city became more determined and made him famous as the leading municipal reformer in America. He opposed party politics in city affairs. The campaign which he initiated, after going through various phases, resulted, in November, 1894, in the defeat of the Tammany organization and the election of the Strong-Goff reform ticket. In theology Dr. Parkhurst was an earnest advocate of a revised confession of faith, and was one of the foremost champions of the cause of Dr. Charles A. Briggs upon charges of heresy for approving some of the so-called "higher criticism." He published sermons, essays in periodicals, *The Blind Man's Creed* (1883), and *Our Fight with Tammany* (1895). In 1895 he organized the "City Vigilance League" in the interests of good government.

PARKMAN, FRANCIS, an American historian; born Sept. 16, 1823, in Boston, Massachusetts.

He entered Harvard University in his seventeenth year, and before graduating in 1844, conceived the idea of writing a history of the French and Indian war. This scheme, despite delicate health and a serious affection of the eyes, he lived to work out, though it embraced much more than a brilliant narrative of that struggle. It included, also, a series of vivid pictures of the early Jesuit missions in North America, sketches of the



FRANCIS PARKMAN.

pioneers of France in the New World, and of the founding of the ill-fated French colony on the St. Lawrence, and a graphic portrayal of the incidents of Mr. Parkman's own sojourn among trans-Missouri Indians before the advent of railways. His mental equipment for what came to be a lifelong task, besides fervor of enthusiasm, included painstaking research and accuracy in the use of his materials, an historical regard for cause and effect, and a dash and brilliancy of treatment which imparted much fascination and great literary charm to his narratives. After leaving Harvard, Parkman read law for two years, then sought recreation in the far West among the Indians, whom he has described with much minute and interesting detail in *The Oregon Trail* (1847); after which he produced, in 1851, *The Conspiracy of Pontiac*, the first in publication, but the last in chronological matter of the series of narratives dealing with the long struggle for mastery on this continent. The author's precarious health, and the time consumed in searching at first hand in the archives of France, Quebec and New England for his material, delayed for a number of years the continuation of the histories. In 1865, however, appeared *The Pioneers of France in the New World*, in 1867 *The Jesuits in North America*, and in 1869 *La Salle and the Discovery of the Great West*. *The Old Régime in Canada* was published in 1874, *Count Frontenac and New France Under Louis XIV* in 1877, and, leaving over, for the time being, the intervening history embraced in the two volumes entitled *A Half-Century of Conflict* (1892), there appeared *Montcalm and Wolfe* (2 vols., 1884), the culminating work of the series reciting the momentous events in the deadly struggle between France and England for dominion in the New World. He died in Jamaica Plain, near Boston, Nov. 11, 1893.

PARKS, NATIONAL, a term used in the United States to designate territory which has been reserved by act of Congress and exempted from sale by reason of picturesque natural features. Four tracts of land have thus been appropriated—the Yellowstone region in Wyoming, the Yosemite Valley, the Sequoia or Big Tree Grove, and General Grant Park in California. (For a full description of the first named, see YELLOW-

STONE NATIONAL PARK, in these Supplements. For a description of the features and scenery of YOSEMITE PARK, see CALIFORNIA, Vol. IV, pp. 698, 699.) The lands embraced within this latter park were granted by the government to the state of California in 1864, to be "held for public use, resort and recreation." In 1890 a bill was passed in Congress, creating a national park about this territory which the state was holding in trust. Its area is about forty miles square; it is under the administration of the Secretary of the Interior, and a detachment of United States troops is maintained there for patrol duty, to ward off stock-raisers and other trespassers, and to guard against fires.

The SEQUOIA and GENERAL GRANT parks, situated to the south and west of the Yosemite, are tracts of much smaller extent, and were created national parks in 1891, for the purpose of preserving the magnificent growths of *Sequoia*, or red-wood trees. They also are patrolled by United States troops, and under direction of the Interior Department.

PARKS, NATIONAL MILITARY.—*Gettysburg*. Much work had already been done to preserve this historic battlefield by the Gettysburg Battlefield Memorial Association, but upon the passage of the bill, passed by Congress in 1895, the entire work passed into the hands of the government. It directs the Secretary of War to receive from the Memorial Association deeds of the various tracts, embracing about 800 acres. The work is in charge of commissioners, who are to lay out roads and mark out the several lines of battle for all the troops engaged. The bill also provides that adjacent lands occupied by the several divisions on July 1, 2, and 3, 1863, shall be acquired by condemnation or purchase. The bill appropriates \$75,000 for purposes of improvement, and \$5,000 for a bronze tablet, upon which is inscribed the historic address of President Lincoln, Nov. 19, 1863, on the occasion of the dedication of the national cemetery at that place. The various states whose troops were in this engagement, aided by contributions from veterans' associations and other sources, have placed numerous fine monuments about the field, and other works are to follow.

Chickamauga and Chattanooga. This park embraces the entire battlefield of Chickamauga and its approaches, inscribing an area of about 15 square miles. The government has also acquired title, among other purchases, to Bragg's headquarters on Missionary Ridge, and to Orchard Knob, the headquarters of Grant, Thomas and Granger. The approaches round about Chickamauga, over which the armies reached and left the field, as well as the roads within the park, have been substantially rebuilt by the government. The roads about Chattanooga follow the lines of battle. Over Lookout Mountain the route includes the battlefield of Hooker, and near Walthall's, while along Missionary Ridge the crest road follows Bragg's line of battle, in front of Thomas's and Sherman's divisions. The result is a magnifi-

cent boulevard, with such charms of bold mountain view, including city, valley and river, which, together with the historic associations, render this drive one with scarcely a parallel. The dedication ceremonies of this new national military park were held on Sept. 18-20, 1895, the thirty-second anniversary of the battle of Chickamauga, and were presided over by Vice-President Stevenson. There were present both Federal and Confederate generals, besides governors, Representatives and Senators from many states.

Shiloh. In 1895 Congress passed a bill which provided for the establishment of a similar park at the field of Shiloh, in the state of Tennessee, embracing an area of about 3,000 acres, together with an appropriation of \$150,000 to carry out the work.

PARKS, NATURAL, OF THE ROCKY MOUNTAINS. These parks constitute one of the interesting features of the state of Colorado. (For a brief and partial description of them, see COLORADO, Vol. VI, pp. 161-163.) The four principal ones within this state bear the names of North Park, Middle Park, Estes Park and South Park. They are not small areas of ground, but great territories, which contain fields and forests, with great stretches of plains on which have roamed immense herds of buffalo or cattle.

North Park, situated in the extreme northern part of the State, covers a part of Routt and Larimer counties. It embraces an area of about 2,500 square miles, and is traversed by the North Fork of the Platte River. It is about sixty miles long and forty miles wide, with an altitude of 9,000 feet above ocean-level. The ranges of the Rockies which environ it rise nearly 5,000 feet higher. The park is, in its general features, an irregular plateau or basin, having a surface with gently rolling hills, and long level bottoms, and valleys clothed with luxuriant grasses and flowers. The hills are covered with timber.

Middle Park, located in Grand County, embraces an area of about 3,000 square miles, and has an altitude of 9,000 feet. Like North Park, it is environed by mountains. Its streams are tributary to Grand River. It contains Grand Lake, on the shore of which is the town of Grand Lake, the county seat of Grand County. About ten miles from Grand Lake is Hot Sulphur Springs, recognized as an attractive spot for invalids and other visitors. The springs are six in number, the waters from which unite in a common stream and flow over rocks into a natural basin. The resorts of Middle Park are fast growing in popularity.

Estes Park is located at the foot of Long Peak, about sixty miles from Denver, and is one of the most beautiful resorts of Colorado. It is about six miles long and four miles wide, with an average height of 7,000 feet. The general contour is much like that of its sister parks, abounding in gentle slopes, dark pines and beautiful winding trails leading from open glades of the valley up dark cañons. Its clear brooks unite to form a considerable stream named Big Thompson's Creek. The road to the park is difficult of ascent,

but is largely traveled by tourists because of the numerous attractions by the way, and by the still greater attraction to be found in the park itself.

South Park, the chief of the park system of Colorado, lies to the south and east of Middle Park, and is isolated from it by a great snowy mountain range. It is fifty miles in length and about ten miles in breadth. Its northern extremity begins about seventy-five miles southwest from Denver, and is reached by the Denver and South Park railway. The maximum elevation is about 10,000 feet and the average elevation about 9,000 feet. Its streams are the tributaries of the South Platte River. Its soil is unexcelled in richness, with easy facilities for irrigation, and the numerous grassy plains are readily converted into luxuriant fields of grain. The park is bounded on the east by a heavily timbered range 2,000 feet above the valley, while to the west are the snowy summits of "the Rockies." The South Park Mineral Springs, and Hartzell's Hot Sulphur Springs are in the southern portion of the park, and give promise of becoming points of great interest to invalids.

San Luis Park, Colorado, lying south of South Park, embraces an area of about 9,400 square miles, or about three times the area of Yellowstone Park. The beautiful San Luis Lake is a principal object of interest, and there are numerous thermal springs possessing medical properties. This park has nowhere an altitude of more than 7,000 feet, and the climate is exceedingly mild and genial.

PARKVILLE, a city of Platte County, northwestern Missouri, 10 miles N.W. of Kansas City, on the Missouri River, 22 miles below Leavenworth, Kansas, and on the Kansas City, St. Joseph and Council Bluffs railroad. It is in a district containing coal, building-stone and brick-clay, and yielding corn, small grains, dairy products, hemp and wool. The city has saw-mills, brickyards and machine-shops. It is the seat of Park College (Presbyterian), a co-educational institution established in 1875, and which, in 1896, had 18 instructors, 390 students and a library of 3,700 volumes. Population 1890, 769.

PARLEMENT, the name applied, in France, down to the Revolution, to certain superior and final courts of judicature, in which, also, the edicts of the king were registered before they became laws. Of these the chief was that of Paris, but there were no fewer than twelve provincial parlements. These, though not actually connected with that of Paris, invariably made common cause with it in its struggles with the royal power. The Parlement of Paris dated from the fourteenth century. Its influence grew during the sixteenth century, and it began to find courage to deliberate on the royal edicts, as well as merely register them, which the King could always force them to do by coming in person and holding a *lit de justice*. Louis XV exiled the members from Paris in 1753 for their interference in the struggle between the Jansenists and the Jesuits, and in 1770 abolished the old Parlement altogether and established the Parlement Mau-

peou. Louis XVI, however, recalled the former councillors.

PARLEY, PETER See GOODRICH, SAMUEL G., Vol. X, pp. 774, 775.

PARLIAMENTARY LAW, the name of that body of rules or usages commonly observed in deliberative assemblies. These usages are sufficiently understood to be put in practice whenever men gather together for conference and the expression of a common judgment. In the main, they followed the principles or order observed by legislative bodies, and hence the name "parliamentary law."

All deliberative bodies that have continued existence adopt their own rules of proceeding, and these supersede any other methods of doing business. Yet there is a substantial accord in all adopted systems of deliberative order, for they all rest upon precedents found to be fair and convenient. Thus a lodge, the political conventions of a party, each state legislature and Congress have each its own body of rules (see CONGRESS, in these Supplements), and yet through them all may be traced the same general usage.

The following statements exhibit the rules that will be observed in transacting the business of any assembly which has not adopted rules of its own. They are:

Organization. When a number of persons has been called together for conference, on their meeting some individual prominently responsible for the summons, will call the assembly to order and ask for the nomination of a presiding officer or chairman. If several names are proposed, and the proposal seconded, the wish of the meeting is taken, in the order of making the nominations, until a majority of voices are given for one person. This person goes forward and takes the chair, and upon him devolves the enforcement of the rules of order. Usually he does not vote on any matter pending before the assembly, though he may ask to be counted with the others in voting, and his right must be respected. He has no tie vote, for a motion is lost that does not have a majority of voices or votes in its favor. The chairman first asks the meeting to choose a secretary, and he is selected in the same manner as the chairman.

With the selection of a secretary the essential organization is complete. It is the duty of the secretary to keep a record of all proceedings, to see that all resolutions are reduced to writing, if so requested, and to read all resolutions, papers or communications for the information of the meeting, as directed by the chairman.

After the chairman has declared the assembly open for business, motions are in order. A *motion* is a formally worded proposition presented to the assembly for its consideration. The member offering it says: "I move," etc. The resolution which he offers commences: "Resolved," etc. The questions are decided by vote. A majority vote decides the question.

In putting a question the chairman says: "The question is on the adoption of the motion (or

resolution, or amendment) which you have just heard. As many of you as are in favor of its adoption will say Aye." When the ayes have voted he will say: "As many as are opposed will say No." After voting is over, the chairman announces the result. Since he has to judge from the number of voices heard, the vote by voice is only approximate. Holding up the hands and counting the uplifted ones is more reliable. When the chair is in doubt as to his estimate of a vote by voice, he asks the members to rise and stand still until counted. This count decides how many votes there are for and how many against the question. If a member doubts the correctness of the chairman's estimate or a vote by voice he will rise and say: "Mr. President, I call for a division of the house." Upon this the chairman says: "A division is called for. Those in favor of the motion will rise and stand until counted." In a similar way he will take the opposing votes. In taking a division of the house, the standing members may be counted by the chairman, or the clerk, or by one or more members appointed by the chair.

Another method of dividing the house, common in the British House of Commons and in Congress, is to have those favoring a proposition pass between two tellers and be counted, and then in the same way take the negative vote.

Again, in representative bodies, a vote may be taken by making each member answer when his name is called and having his vote recorded. In Congress this mode of voting must be resorted to when the demand for it is sustained by one fifth of the members present. Voting by ballot is usually required in the election of officers, in the admission of new members, and also when secrecy is desired. In the admission of members, white and black balls, or slips of paper, are often employed.

Motions, and their Treatment. After a motion has been presented, other motions bearing upon the same subject are in order. The first motion is then called the "main" question, the subsequent ones are subsidiary or secondary. The most common of the subsidiary motions is that to amend the main one. The mover offers an amendment. Then others may move to amend the amendment, but no further amendment can be offered until the second one is disposed of. The vote on the amendment to the amendment must first be taken. If adopted, the question arises on allowing the amended amendment to modify the main question. If this prevails, then a vote must be taken on adopting the main question as amended. If all amendments are rejected, a vote is taken on the resolution as originally offered.

If a motion to *postpone to a certain day* is moved and carried, when the day has come the subject is entitled to be taken up in preference to everything else except privileged questions. If a motion to *postpone indefinitely* is made and carried, the question is killed, and to bring the subject up again would require new proceedings from the beginning, at some later time.

A motion to *refer* or *commit*, if adopted, takes the question from the meeting and transfers it to the consideration of a committee. A motion to *recommit* takes a subject already reported by a committee back to the same committee. All the above-mentioned motions are debatable.

A motion to *lay on the table* is not debatable. If adopted, it removes the question from consideration until the assembly votes to take it up. This can be done at any time by a majority vote. The motion to lay on the table carries the main question and all amendments with it.

The *previous question* is a method of cutting off debate. It is undebatable. It is equivalent to the question, Shall the discussion now cease? A member rises and says: "I move the previous question." Then the chairman puts the question before the house by saying: "Shall the main question be now put?" If the previous question is carried, the debate on a pending amendment, or both amendment and the main question, is stopped.

Incidental Questions. There is a class of questions which are called incidental. These include,—
1. Questions of order; 2. Objections to the consideration of a question; 3. Reading of papers; 4. Withdrawal of a motion; and 5. Suspension of the rules.

If anything in the procedure is against parliamentary law or the rules of the house, and a member, rising, addresses the house thus: "I rise to a point of order," the chairman will interrupt the proceedings and say: "The member will state his point of order." The member then will state his point, and the chairman thereupon will decide whether the point is, or is not, well taken. If, now, any member is dissatisfied with the decision of the chair, he takes "an appeal to the house." The question then is: "Shall the decision of the chair stand as the judgment of the assembly?" An appeal to the house is debatable, except when the previous question was pending at the time when the point of order was raised. To sustain the chair does not require more than a majority vote. Even a tie vote sustains his decision.

Privileged Questions. Some questions may be introduced at almost any time, and must be considered before any other subject that may be before the house. These privileged questions are: 1. To adjourn; 2. To fix the date to which the body shall adjourn; 3. Questions of privilege; 4. A call for the order of the day.

A motion to adjourn is nearly always in order. The exceptions are these: If a motion to adjourn has just been lost, it cannot be repeated until there has been some business done or some progress in the debate made since the motion had been lost. Neither can the motion to adjourn be made while a member has the floor. But the member may give way in order that the motion may be presented. A motion to adjourn cannot be received while the yeas and nays are being called, or while the members are voting on any question, or when the previous question has

been called and sustained and is still pending. The motion to adjourn cannot be debated or amended. It supersedes all other motions except the one to fix the date to which to adjourn. The motion to fix the time to which the adjournment will stand, when the meeting does adjourn, takes precedence of all other questions. It may be made after the meeting has voted to adjourn, as long as the chairman has not announced the result of the vote. It may be amended by changing the date of reassembling.

The general rule as to the rank of questions is that of the United States House of Representatives, which is as follows: "When a question is under debate no motion shall be received but to fix the day to which the house shall adjourn, to adjourn, to take a recess, to lay on the table, for the previous question . . . to postpone to a certain day, to refer or amend, or to postpone indefinitely, which several motions shall have precedence in the foregoing order."

A motion to *reconsider*, if carried, brings back before the house a question that has been decided, and places it again before the house just as it stood before the vote was taken upon it; but, as the rule of the United States House of Representatives puts it, "the fact of a question having been decided under the operation of the previous question does not prevent debate on the motion to reconsider if the original question was otherwise debatable." The motion to reconsider may be applied to votes on all questions excepting on motions to adjourn, to suspend the rules, affirmative votes on motions to lay on the table or take from the table, on matters which have passed from the possession of the house, and on the previous question when it has been partly executed. It may be made when other business is before the house.

Duties of the Chairman. The chairman must recognize the member who rises first and addresses him first. No member can be deprived of his rights by the chair, as long as he is in order. But there is this exception: When the member, upon whose motion the subject on hand has been brought before the house, has not spoken on the question and asks to be heard, the chairman is bound to give him the first chance to speak. During the debate the chairman has no right to cut it off before all the members who have asked for the floor have had their chances. When a vote has been taken and the result announced, if it appears that a member had risen and addressed the chair at the proper time, but was not recognized, even then his right to speak must be conceded, and the question voted upon will stand as though no vote had been taken.

Most legislatures have rules of order substantially like those of the House of Representatives in Congress. Two excellent manuals of parliamentary law are *Robert's Rules of Order* (1893) and *Reed's Parliamentary Rules* (1894). See also *PARLIAMENTARY PROCEDURE*, Vol. XVIII, p. 311.

PARMA, ALEXANDER FARNESE. See FARNESE, Vol. IX, pp. 37, 38.

PARMA, DUKES OF. See PARMA, Vol. XVIII, p. 314.

PARNAHYBA OR PARANAHYBA RIVER. See BRAZIL, Vol. IV, p. 222. For the town, see PARNAHYBA, Vol. XVIII, p. 258.

PARNASSIENS, a group of French poets of the second empire, so designated from the title of the volume *Parnasse Contemporain*, which comprised their first poems, collected in 1866. These poems are characterized by a cultivation of metrical form before all else, and the rejection of emotion as a poetic stimulus in favor of that which is spectacular or which appeals to the senses.

PARNELL, CHARLES STEWART, an Irish politician, and during the Home Rule agitation "uncrowned king" of the Irish Nationalists, and leader (1878-91) of the Parnellite party in Parliament, was born in Avondale, County Wicklow, Ireland, June 28, 1846. His family, which originally belonged to Cheshire, England, was for upward of a century associated with Irish Parliamentary life. His father was Charles Henry Parnell, and his mother



was a daughter of Commodore Charles Stewart of the United States navy. Young Parnell was educated at various private schools in England, and afterward entered Magdalen College, Cambridge. After a tour in the United States, he returned to his home in Wicklow and became high sheriff of the county in 1874. After various unsuccessful efforts to enter Parliament, he was returned in 1875 for the county of Meath. For some time he took no prominent part in the proceedings of the House, but during the session of 1876 he attracted attention by engaging in one or two prolonged and stubborn conflicts with the government. In February, 1877, he made his first appearance as a legislator, introducing the Irish Church Act Amendment Bill, the object of which was to facilitate the purchase of their holdings, by the tenantry of the disestablished Irish Church. The bill was thrown out by 150 to 110 votes. The introduction of the Prisons Bill by Sir Richard (then Mr.) Cross, gave rise to the first real development of "obstruction" by the Irish faction in Parliament. Henceforth and until his death his career was bound up with the history of the Home Rule movement. See HOME RULE in these Supplements.

He retained the leadership of the Irish Parliamentary party until 1890, when the publication of his relations with Mrs. O'Shea, which became public in the divorce court, led to its division into Parnellites and anti-Parnellites. The latter, believing that their late leader's usefulness was gone, chose for their leader, Justin McCarthy, who later became the recognized head of the Nationalists.

For a time Parnellism continued to be a force in politics, but it was a waning force. Although he was a Protestant, the Irish priesthood had long sustained his political schemes, but it now opposed him at the polls as a violator of the marriage sacrament. The dissensions in the Irish party grew wide and furious, and, in the tumult, death closed Parnell's remarkable career, Oct. 6, 1891. See also HOME RULE, in these Supplements.

PARNELL, HENRY BROOK. See CONGLETON, Vol. VI, p. 265.

PARNELL INQUIRY. See HOME RULE, in these Supplements.

PARNELLITES AND ANTI-PARNELLITES. See HOME RULE, in these Supplements.

PAROL, a term used in American law to describe verbal contracts, and written contracts not under seal. All contracts, whether in writing or verbal, are called parol contracts unless they are under seal. Sealed instruments are generally called specialties. Under the old common law the pleadings in a suit were sometimes referred to as the parol. Parol evidence is that which is given in open court verbally.

PAROLE, the declaration made by a person in which there is no more than his sense of honor to restrain him from breaking his word. Thus a prisoner of war may be released from actual prison on his parole that he will not go beyond certain designated limits, or he may even be allowed to return to his own country on his parole not to fight again, during the existing war, against his captors. To break parole is accounted infamous in all civilized nations, and an officer or soldier who has done so forfeits any claim to be treated as an honorable man, nor can he expect quarter should he again fall into the hands of the enemy.

PAROPAMISAN MOUNTAINS. See ASIA, Vol. II, p. 686.

PAROTID GLAND. See DIGESTIVE ORGANS, Vol. VII, p. 222.

PAROWAN, a city and the capital of Iron County, southwestern Utah, about 220 miles S.S.W. of Salt Lake City, on Center Creek. It is situated in a region giving large agricultural yields, and said to contain coal, iron and silver. The city has tanneries, saw-mills and a flour-mill. Population, together with precinct, 1890, 937.

PARR, KATHARINE, a tutor to Queen Elizabeth and last wife of Henry VIII. See ENGLAND, Vol. VIII, p. 337.

PARR, THOMAS, a centenarian. See LONGEVITY, Vol. XIV, p. 858.

PARRAKEET, PARAKEET OR PARROQUET. See PARROT, Vol. XVIII, p. 321.

PARRIDÆ. See JACANA, Vol. XIII, p. 531.

PARROTT, ROBERT PARKER, an American inventor; born in Lee, New Hampshire, Oct. 5, 1804; graduated at West Point (1824;) assistant professor in the same institution for five years; served in garrison (1831-34); became captain of ordnance (1836), and superintendent of the West Point cannon foundry at Cold Spring, New York, in 1836. In this institution he invented and

perfected the rifled cannon which has received his name and of which the government used large numbers during the Civil War. From 1844 to 1847 he was judge of the court of common pleas of Putnam County. He resigned the superintendency of the foundry in 1867, after which he was president and director of several industrial enterprises. He died in Cold Spring, New York, Dec. 24, 1877.

PARRY, CHARLES CHRISTOPHER, an American botanist; born in Admington, England, Aug. 28, 1823; removed to the United States in 1832; graduated at Union College; removed to Davenport, Iowa, in 1846, and practiced medicine there for several years, at the same time studying the flora of the adjacent counties. In 1848 he became botanist of the Owen geological survey of the Northwest, and subsequently served in the same capacity in the Mexican boundary survey (1849-52), the Pacific railroad survey (1867) and in the Department of Agriculture (1869-71). He spent several years in collecting in the Rocky Mountains, Utah, Texas and California, and wrote a number of works, among which are *Botanical Observations in Western Wyoming* (1874); *Botanical Observations in Southern Utah* (1875); *Revision of the United States Pacific Coast Species of Arctostaphylos* (1883); *The North American Genus Ceanothus* (1888). He died in Davenport, Iowa, Feb. 20, 1890.

PARRY, CHARLES HUBERT HASTINGS, an English musical composer; born in Bournemouth, Feb. 27, 1848; graduated at Oxford in 1870; received the degree of Mus.Doc. at Cambridge in 1883 and at Oxford in 1884; professor of musical history and composition at the Royal College of Music in 1883 and choragus of Oxford University in 1884. Among his later compositions are *Studies of Great Composers*; *Duo* in E minor for two pianofortes; *Trio* for pianoforte, violin and cello in E minor; *Quartet* for pianoforte and strings in A minor; *Nonet* for wind instruments in B flat; *Guillem de Cabestanh* for orchestra; *Fantasia and Fugue* for organ; scenes from Shelley's *Prometheus Unbound* for solo voices, chorus and orchestra (1880); *De Profundis* for twelve-part chorus (1891); the oratorios *Judith* (1888); *King Saul* (1894); and his greatest, *Job*; *Ode for St. Cecilia's Day* (1889); *L'Allegro ed Il Penseroso*, a cantata (1890); and others.

PARRY, JOSEPH, a British musical composer; born in Merthyr-Tydfil, Wales, May 21, 1841. In 1854 he went to the United States with his parents, but in a few years returned and received instruction in music, for which he had real talent. In 1862 he won prizes at the Llandudno Eisteddfod, and in 1863 at the Swansea Eisteddfod. In 1868 he entered the Royal Academy of Music, and studied under Sterndale, Garcia and Steggall. He was appointed professor of music at the University College, Aberystwith, and soon after took his Mus.Bac. degree at Cambridge, and in 1878 that of Mus.Doc. at the same university. Among his compositions are *Blodwen*,

an opera performed in 1878, and *Emmanuel*, an oratorio performed in 1880.

PARRY SOUND, a town and the capital of Muskaka and Parry Sound District, northwestern Ontario, Canada, 50 miles N. of Midland, on Parry Sound, an eastern arm of Georgian Bay; at the western terminus of the Canadian Atlantic railroad and having steamboat connection with lake ports. The town is the center of a district devoted almost exclusively to the lumber industry; has large saw-mills in the vicinity, and is an important shipping-point for their product. Population 1891 (estimated), 2,000; with McDougall and Parry Island, 2,337.

PARSEES. See **PARSIS**, Vol. XVIII, pp. 325-327.

PARSLEY. See **HORTICULTURE**, Vol. XII, p. 289. p. 289; and **UMBELLIFERÆ** in these Supplements.

PARSNIP. See **HORTICULTURE**, Vol. XII, p. 285; and **AGRICULTURE**, Vol. I, p. 369.

PARSON-BIRD. See **HONEY-EATER**, Vol. XII, p. 139.

PARSONS, a city of Labette County, southeastern Kansas, about 35 miles S. of Humboldt and about 12 miles N.W. of Oswego. It is an important railroad center, being located upon the Kansas City, Fort Scott and Memphis and on several branches of the Missouri, Kansas and Texas railroads; is a trading and shipping point for a farming and grazing district; contains machine-shops of the Missouri, Kansas and Texas railroad, giving employment to a large number of hands, and manufactories of plows, furniture, pottery and tiles; has banks, several churches, a public library, good school system, two daily and six weekly newspapers. Population 1890, 6,736; 1895, 7,573.

PARSONS, a post borough of Luzerne County, eastern Pennsylvania, 2 miles E. of Wilkesbarre, on the Delaware and Hudson railroad and the Central Railroad of New Jersey. It is in a region devoted almost exclusively to coal-mining, and has several collieries. Population 1890, 2,412.

PARSONS, SAMUEL HOLDEN, an American soldier and jurist; born in Lyme, Connecticut, May 14, 1737, graduated at Harvard (1756); admitted to the bar (1759); from 1762 representative in the legislature for many years; King's attorney (1774); commanded the Sixth Connecticut Regiment at Boston (1775); brigadier-general (1776); major-general (1780). After the Revolutionary War he practiced law at Middletown, Connecticut, and was a member of the convention for the ratification of the Constitution of the United States in 1788. He was appointed by President Washington first judge of the Northwest Territory, and was Connecticut's commissioner to purchase from the Wyandotte Indians the tract known as the Western Reserve, in Ohio. He published a valuable paper on the antiquities of the Western States. He was drowned in Big Beaver River, Ohio, Nov. 17, 1789.

PARSONS, THEOPHILUS, an American jurist; born in Byfield, Massachusetts, Feb. 24, 1750; graduated at Harvard in 1769, and admitted to the bar at Falmouth, Massachusetts (now Portland, Maine) in 1774. Settling in Newburyport, Massachusetts, he

commenced a practice which in time included the New England states. In 1779 he was a member of the convention that framed the state constitution, and of the convention of 1788 for the ratification of the Constitution of the United States. In 1800 he moved to Boston, and in 1806 became chief justice of the supreme court of the state. He possessed scholarly attainments, and was as famous for his wit as for his judicial decisions. He died in Boston, Oct. 30, 1813.

PARSONS, THOMAS WILLIAM, an American author; born in Boston, Aug. 18, 1819; educated at the Boston Latin School; went to Italy in 1836 and studied Italian literature there. In 1843 appeared his translation of the first ten cantos of Dante's *The Inferno*. Returning to Boston, he studied and practiced dental surgery. He resided several years in England, remaining away from America till 1872. Whether at home or abroad he continued the translation of Dante and the production of original verse, the first volume of his poems, *Ghetto di Roma*, appearing in 1854. In 1867 *The Inferno* was completed and published. *The Old House at Sudbury* came out in 1870 and *The Shadow of the Obelisk, and Other Poems* in 1872. His translation of *The Inferno* ranks high among the English versions by virtue of its warm sympathy of spirit and its simplicity in style, approaching that of Dante. For many years he lived quietly in Boston, spending his summers in Scituate, Massachusetts, where he died Sept. 3, 1892.

PARTHENOGENESIS, in botany, is applied to cases in which the oösphere (female gamete) germinates without fertilization, as though it were an oöspore. Notable examples are to be found among the *Saprolegnia*, a fungus group of water-molds. The so-called cases of parthenogenesis among seed-plants do not belong in this category.

PARTHENOGENESIS, a mode of reproduction in which ova develop without being fertilized. This phenomenon is common among certain lower crustacea, certain insects and some plants. In the common bee the eggs last deposited develop, without fertilization, into drones. In some flies the ova develop parthenogenetically while still in the larval stage, a condition known as pädogenesis. In the pylopods and other entomostracan crustaceans, males seem to appear only on the beginning of unfavorable conditions, such as the approach of winter. At such times eggs are laid and fertilized. These lie dormant until the return of favorable conditions, when they develop into individuals, which reproduce parthenogenetically. Parthenogenetic generations then succeed one another until unfavorable conditions return. No satisfactory explanation has yet been advanced. Weismann held that there was some connection between parthenogenesis and the number of polar bodies separated from the egg, since in certain parthenogenetic eggs but one polar body is formed, while two are usually formed in all eggs requiring fertilization. However, this explanation is not satisfactory, for in some cases two polar bodies are formed and the egg develops parthenogenetically. See **HYMENOPTERA**, Vol. XII, p. 574; **INSECTS**, Vol. XIII, p. 146; **REPRODUCTION**, Vol.

XX, p. 427; and EMBRYOLOGY, in these Supplements.

PARTHENON. See ATHENS, Vol. III, pp. 5, 6. Sculptures of. See ARCHÆOLOGY, Vol. II, p. 356; also ARCHITECTURE, Vol. II, opp. p. 403.

PARTHIAN, EMPIRE. See PERSIA, Vol. XVIII, pp. 586-607.

PARTICK, a town of Lanarkshire, southwestern Scotland, prettily situated, chiefly on a rising ground on the Kelvin, immediately above its junction with the Clyde, and 3 miles N.W. of the Cross of Glasgow, of which city it now forms a suburb. Nine tenths of the workmen of Partick are engaged in shipbuilding-yards, but there are also many flour-mills, cotton factories and bleach-fields. Many of the inhabitants carry on business in Glasgow and have handsome homes in Partick. Population 1891, 36,538.

PARTNERSHIP. Every association of two or more persons for the purpose of doing business on joint or undivided account is a partnership. As a rule, the term is only applied to unincorporated business associations. A partnership may be constituted either by the respective persons contributing capital or skill, or one or more furnishing capital and others skill.

The general principles of law governing contracts are to be extended to the relation of persons in partnership with each other. Persons entering into partnership must not be incapacitated to enter into this contract; that is, they must not be minors, or imbeciles, or under duress, etc. The capital of a mercantile partnership usually consists of personal property, though there may also be real estate, and for the purposes of the partnership. The question may arise whether this land is to be governed by the technical rules applying to real estate, or by those which prevail in the law of personal property. If a partner dies, his widow can have no dower in this land, nor can his heirs inherit, until all the partnership debts are paid and the joint affairs are fully settled. After this the widow can have her dower and the heirs can inherit.

The "good-will" of a partnership is often an important part of its assets. This is the expectation that customers will continue to resort to the place where the business is transacted. The good-will is property of a peculiar kind. It cannot be sold by a sheriff on an execution, as it is in its nature intangible. When one of the partners dies, his executor can only realize something from this source by selling the stock and premises together. In this case the good-will goes naturally with the sale of the premises.

Partners are classified into secret, dormant, nominal and ostensible. A "dormant" partner is one who supplies capital but takes no active part in the management. A "secret" partner is one who is not known as a partner, though he may be active in the interest of the concern. A "nominal" or "quasi" partner is one who has no real connection with the firm, but holds himself out as a partner. Persons who give credit to the firm on the faith of his name may hold him liable on the ground of estoppel.

In some of the states there is a partnership known as limited. In a "limited" partnership no liability is incurred by the members beyond the amount of their subscription. It is in the nature of a corporation. "Joint-stock companies" are partnerships consisting of a large number of persons whose liability is usually that of a general partner. Holding land in partnership by speculators is recognized as true partnership, but farming land on shares has been held to be no partnership.

One who merely lends his name to a firm (nominal partner) is liable to those who have acted upon the supposition that he was in fact a partner. He may directly assert his partnership, or he may give the firm permission to use his name over the shop-door or in printed notices, bills, advertisements, etc.: in all cases he will be estopped from denying his liability as a partner, even if he has no share whatever in the firm. It is essential, however, that this holding himself out as a partner should have been prior to the contract with the third person, as well as the inducement to it.

A point of interest in partnership law is the capacity of one member of a firm to bind his associates in respect to third persons. The partnership liability rests upon the participation in the profits; because, whenever a person takes by agreement a share of the profits of a firm, he withdraws a portion of the funds to which the creditors of the firm had a right to look for reimbursement. He should accordingly be held liable to the creditors. This is the doctrine laid down in a celebrated early English case, *Waugh vs. Carter*, which has been quite generally followed in the courts of the United States. The New York court of appeals has reaffirmed, in the case of *Leggett vs. Hyde*, the correctness of this theory, and makes the participation of profits the basis of partnership.

If a partner gives a promissory note and signs the firm-name without the consent of his associates, and this note is taken up before maturity in the regular course of business by a purchaser in good faith, the latter can collect the note from the firm, notwithstanding the partner who has executed the note has no right whatever to bind the firm by such a note. The ground of this rule is, that the partner issuing the note had the "apparent authority" to issue it, and that a third party could not possibly distinguish this note from others which the partner has a real right to issue. If, however, the purchaser of the note knew, or had reasons to know, that the partner was violating his duty, the firm will not be liable for the note.

Owing to the intimate relations between partners, the act of one is for many purposes the act of all. Notice to one of any fact touching their common business is notice to all. An admission made by one is supposed to be made by all. Such an admission, if it affects their common interests, is receivable in evidence. If one of the partners commits a wrongful act (tort), or commits a fraud, in connection with the common business, all of them are answerable for it. The liability ceases when the wrongful act is wholly unconnected with the partnership business.

The relation of partners between themselves is

largely based on trust and confidence. This view prevents each one from doing any act without the partners' consent in reference to the firm business, which shall inure to his own advantage. Thus, if he buys up a claim against the firm for less than its face value, he can only charge to the firm what he actually paid. If he take from a landlord, in his own name, a renewal of a valuable lease belonging to the firm, he will be obliged to account as a trustee for the profits which may accrue.

DISSOLUTION OF PARTNERSHIP. A partnership may be dissolved in a number of ways. The leading modes are:

- (a) The express consent of the parties.
- (b) The sale by one of his interest.
- (c) Death of one or more members.
- (d) Bankruptcy.
- (e) Marriage of a female partner.
- (f) Insanity legally established.
- (g) The fact that one becomes by the law of nations an enemy of his associates.

(h) The action of a court of equity decreeing a dissolution on such grounds as, that the ends sought to be accomplished are impracticable; or, that one of the firm is so conducting himself as to bring disaster upon the common interests; or, is in such a state of mind that he cannot contribute to the common advantage, etc.

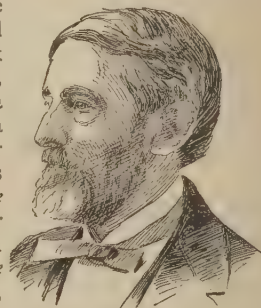
- (i) The voluntary withdrawal of a member.

The effect of the dissolution is to prevent any new contracts from being made. It only remains to pay outstanding debts and to close existing transactions. Actual notice of dissolution must be brought home to persons who have been in the habit of dealing with the firm; with regard to persons who have had no previous dealings with the firm, notice in the newspapers is sufficient. This notice is necessary to terminate the agency of each partner and his powers and liabilities as such. When the dissolution takes place by operation of law or by the death of a partner, notice is not necessary. See also **PARTNERSHIP**, Vol. XVIII, pp. 329-332.

PARTON, ARTHUR, an American landscape-painter; born in Hudson, New York, March 26, 1842; studied at the Pennsylvania Academy of Fine Arts in Philadelphia; went to Europe in 1870, and studied in Paris; removed to New York in 1865; associate of the Academy of Design in 1871 and academician in 1884. In 1886 he received a gold medal at the American Art Association for his *Evening after the Rain*. Among the more important of his works are *On the Road to Marcy*, owned by Charles Farwell of Chicago; *A Mountain Brook*, purchased by A. T. Stewart, New York; *November*, owned by Lord Moncke, ex-Governor-General of Canada; *Sycamores of Old Shokam* (1876), in Amherst College collection; *Delaware River, near Milford* (1879); *Winter on the Hudson* (1885); etc.—His brother, **ERNEST**, also a landscape-painter, was born in Hudson, New York, March 17, 1845; spent two winters in the studio of his brother, but received no instruction from regular masters. In 1873 he opened a studio in London, and frequently exhibited at the Royal Academy, the Academy of Design, New York; and elsewhere. He received a

medal from the Boston Art Institute in 1883, and became a member of the Royal Institute of Painters, London, and the Artists' Fund Society, New York. Among his most important works are *Morning Mist* (1873); *Papa's Lunch* (1875); *The Placid Stream* (1876); *The Silent Pool, Reflections, Au Bord de l'Eau* and *On the River Loing* (1878); *Silver and Gold* (1882); *Where Memory Dwells* (1884); *Last of October* (1886); etc.

PARTON, JAMES, an American author; born in Canterbury, England, Feb. 9, 1822; went to the United States at the age of five years; attended the schools of New York City and White Plains, New York; became a teacher in Philadelphia and New York City. For some three years he was connected with the *Home Journal* as contributor and assistant editor. In 1856 he published *The Life of Horace Greeley*, gathering many of his facts from Greeley's



JAMES PARTON.

neighbors in Vermont and New Hampshire; this work was very successful, and Mr. Parton took up literature as a profession. In 1856 he married Sara Payson Willis Eldridge, sister of N. P. Willis and widow of C. H. Eldridge, of Boston, known under her pen-name of "Fanny Fern." He resided in New York till 1875, when he removed to Newburyport, Massachusetts, which became his permanent residence. Two years after the death of his wife, which occurred in 1872, he married her daughter by her first husband. By the laws of Massachusetts such a marriage was illegal; on petition of Mr. Parton the legislature amended the law and legalized this marriage. He wrote many works, chiefly biographical, and contributed largely to journals upon literary, social and political topics. Among his more important writings are *Life and Times of Aaron Burr* (1857); *Life of Andrew Jackson* (1860); *Life and Times of Benjamin Franklin* (1864); *The People's Book of Biography* (1868); *Life of Thomas Jefferson* (1874); *Life of Voltaire* (1881); *Captains of Industry* (1884 and 1891). He died in Newburyport, Massachusetts, Oct. 17, 1891.—**SARA PAYSON PARTON (Willis)**, story-writer, wife of James Parton, was born in Portland, Maine, July 7, 1811; educated in the schools of Boston and at Catherine Beecher's Seminary, in Hartford, Connecticut; married Charles H. Eldridge, cashier of a bank in Boston. Upon the death of her husband she attempted to gain a livelihood by writing for Boston periodicals; her articles at once attracted attention. She removed to New York in 1854 and for sixteen years furnished the *New York Ledger* an article every week. In 1856 she married James Parton, then assistant of her brother, Nathaniel P. Willis, in the office of the *Home Journal*. She always retained the pen-name of "Fanny Fern," signed to her first productions. Her writings are for the most part humorous and satirical, among which are

Fern Leaves from Fanny's Portfolio (2 vols., 1853-54); *Little Ferns for Fanny's Little Friends* (1853); *Ruth Hall*, a novel based on incidents in her own life (1854); *Rose Clark*, a novel, (1857); *A New Story Book for Children* (1864); *Ginger Snaps* (1870); *Caper-Sauce: A Volume of Chit-Chat* (1872). See *Fanny Fern: A Memorial Volume*, by James Parton (1873). She died in New York, Oct. 10, 1872.

PARTRIDGE, a popular name applied to several widely different species of game-birds of the grouse family. The partridge of England is *Perdix cinerea*. The red-legged partridge of the continent is *Caccabis rubra*. The ruffed-grouse (*Bonasa umbellus*) of the northern United States is called partridge in some localities. In other localities, quail and other allied birds have the popular name applied to them. See PARTRIDGE, Vol. XVIII, p. 332; and QUAIL, Vol. XX, p. 147.

PARTRIDGE, ALDEN, an American soldier and educator; born in Norwich, Vermont, in 1785; graduated at the United States Military Academy, Oct. 30, 1806; commissioned first lieutenant of engineers and appointed assistant professor of mathematics; captain in 1810; professor of mathematics and Engineering in the Academy (1813-16), and in command during the absence of the superintendent. He resigned in 1818, and in 1819 had charge of the survey of the northwest boundary of the United States. In 1820 he founded a military school at Norwich, Vermont, afterward incorporated as Norwich University, of which he was president till 1843. He founded military schools at Portsmouth, Virginia, in 1840; Pembroke, New Hampshire, in 1847; Harrisburg, Pennsylvania, in 1850; and Brandywine Springs, Delaware, in 1853; frequently lectured on military subjects; and gave instruction to the militia in the Western states. In 1833-34 he was a member of the Vermont legislature. He died in Norwich, Vermont, Jan. 17, 1854.

PARTRIDGEBERRY, the common name of *Mitchella repens*, a plant of the family *Rubiaceæ*. It is a small plant, common in forests, creeping over the ground, with small, round evergreen leaves, white or purplish-tinged fragrant flowers in pairs at the end of branches, and the two ovaries united to form a single persistent scarlet berry.

PARTURIENT FEVER. See VETERINARY SCIENCE, Vol. XXIV, p. 404.

PARTY-WALL. A party-wall is a wall erected on the boundary-line between two estates, and is owned by and subject to the joint use of the owners of the adjoining estates. The ownership is generally in common, but each party may own the wall to the center and have an easement or right to use the other half, or one party may own the wall and the other own a right to use it as a dividing-wall. Party-walls may become such by contract, prescription or statute.

PARVATI, a myth. See BRAHMANISM, Vol. IV, p. 208.

PARVIN, THEOPHILUS, an American physician; born in Buenos Ayres, South America, Jan. 9, 1829; graduated at the University of Indiana in 1847, and received his degree of M.D. from the University of Pennsylvania in 1852. From 1864 to 1869 he was

professor of obstetrics in the Medical College of Ohio; in the medical department of the University of Louisville till 1872; in the Indiana Medical College till 1883, when he was elected to the same chair in the Jefferson Medical College, Philadelphia, Pennsylvania. In 1881 he was president of the Indiana State Medical Society, and in 1879 of the American Medical Association; he was also president of the American Academy of Medicine and of the American Gynæcological Society. He published *Science and Art of Obstetrics* (1886, 2d ed. 1890); *Obstetric Nursing* (1889); and edited *Winckel on Diseases of Women*.

PASADENA, a city of Los Angeles County, southern California, nine miles N.E. of Los Angeles, on the Los Angeles Terminal and the Southern California railroads, in the San Gabriel valley; is one of the most popular health-resorts of the Pacific coast. Since 1880 its growth has been phenomenal and its population has increased in a greater ratio than that of almost any other town in the state, while the improvements made upon its site are of an attractive and substantial character. It contains churches, schools, banking facilities, etc.; an opera-house and two commodious and well equipped public halls, five hotels, and other accommodations for the convenience of the visitors annually sojourning there to avail themselves of the benefits and health-giving properties of the climate. The raising of oranges and other fruits is the principal business interest of the vicinity, and large shipments of these productions are made yearly from Pasadena to the Eastern states and elsewhere. Some manufacturing is carried on in the city, including grist and planing mills, electric-appliance and barbed-wire factories, a fruit-canning establishment, and other enterprises. The city is lighted with gas and electric lights. Population 1880, 391; 1890, 4,882; estimated in 1896, 15,000.

PASARGADE. See PERSEPOLIS, Vol. XVIII, p. 558.

PASCAGOULA RIVER AND BAY. The Pascagoula River, navigable for small steamboats, is formed by the junction of the Leaf and Chickasaw-bay rivers, in the southern part of Greene County, southeastern Mississippi; flows through Greene and Jackson counties, and, after a very winding course of about eighty-five miles in a southerly direction, it empties into Pascagoula Bay, an arm of Mississippi Sound in the northern part of the Gulf of Mexico. It is separated from the larger body of water by low, narrow islands.

PASCO, SAMUEL, an American soldier and public man; born in London, England, June 28, 1834. He removed with his father to Prince Edward Island; thence to Massachusetts; was prepared for college in Charlestown, and graduated at Harvard in 1858; in 1859 he went to Florida to take charge of the Waukeenah Academy; in 1861 he entered the Confederate army as a private; at the close of the war, became clerk of the circuit court of his county; was admitted to the bar in 1868; in 1872 became a member of the Democratic state committee, and from 1876 to 1888 was its chairman; in 1880 was elected a Presidential elector-at-large; in 1885 was president

of the constitutional convention of his state; in 1887, while speaker of the state house of representatives, was elected to the United States Senate. He was re-elected in 1893.

PASCOAG, a village of Providence County, northern Rhode Island, 23 miles W.N.W. of Providence, on the New York and New England railroad. It is in a section having numerous manufacturing towns and machine-shops and many woolen-mills. Population 1890, 2,246.

PASEWALK, a town of Pomerania, northeastern Prussia, 24 miles by rail W.N.W. of Stettin, on the Uker River. It was plundered and burned three times—by the Imperialists in the Thirty Years' War, by the Poles in 1657, and by the Russians in 1713. It is inclosed by a wall, and has manufactories of leather and woolen cloth. Population, 9,500.

PASHA (spelled also *pacha* and *bashaw*), a title derived from the Persian, used in the Ottoman Empire. Originally applied to princes of the blood, the title was subsequently extended to governors of provinces, military and naval commanders, and other officers of high rank. As a mark of favor, the title is sometimes conferred on persons holding no office. The district governed by a pasha—who may be one of three ranks—is called a pashalik.

PASHT OR PAKHT. See EGYPT, Vol. VII, p. 718.

PASINI, ALBERTO, an Italian *genre* painter; born in Busseto, near Parma, Italy, in 1820; chevalier of the Order of Saints Maurice and Lazarus, and of the Legion of Honor; officer of the Orders of Turkey and Persia. He was a pupil of Ciceri, Isabey and Rousseau. His pictures are for the most part scenes in Turkey and other Oriental countries, and are notable for their rich coloring. Eleven of them were at the Paris Exposition of 1878, and at the Salon the same year he exhibited *Turkey in Asia* and *The Door of a Khan at Brousse*. A medal of honor was awarded him at the Paris Exposition in 1878.

PASIPHÆ. See MINOS, Vol. XVI, p. 478.

PASO DEL NORTE, EL, a city of Mexico. See JUAREZ, in these Supplements.

PASPATI, ALEXANDER GEORGE, a Greek philologist and historian; born in the island of Scio, in 1814; captured in 1822 and sold into slavery at Smyrna; taken to the United States; graduated at Harvard in 1831; studied medicine in Paris and Pisa in 1834-39; a physician in Constantinople in 1840-78; and professor in the university at Athens. He was well versed in linguistic science, his philological investigations taking a wide range. His works were published in English, French and Greek, a number being devoted to an exposition of the modern Greek dialects and the Gypsy language and literature. They include *Études sur les Tchinghianès ou Bohémiens de l'Empire Ottoman* (1870); *The English Version of the Revised New Testament* (1882); etc. He died Dec. 24, 1891.

PASQUE-FLOWER. See HORTICULTURE, Vol. XII, p. 253.

PASSAGLIA, CARLO, an Italian theologian; born near Lucca, March 2, 1812; educated as a Jesuit; in 1844 became professor in the Collegio Romano. He

left the Jesuits in 1859, and took an active part in the discussions as to the temporal power of the Pope. In 1861 he published his *Pro Causa Italica ad Episcopos Italianos*, in which he maintained that the secular power of the Pope was unnecessary, and counseled him to abandon it in obedience to the voice of united Italy. For this work he was compelled to leave Rome; King Victor Emmanuel at once appointed him professor of moral philosophy at the University of Turin. He was elected a member of the Italian Parliament in 1863, and opposed the occupation of Rome by the French. In 1882 he was reconciled to the Holy See and resumed ecclesiastical functions. He was one of the most learned theologians of Italy, and eminent for his eloquence. He died in Turin, March 12, 1887.

PASSAIC, a city of Passaic County, northern New Jersey, on the Passaic River, and on the Delaware, Lackawanna and Western, the New York, Lake Erie and Western and the New York, Susquehanna and Western railways, 11 miles by rail N.W. of Jersey City and 5 miles S.S.E. of Paterson. The city is beautifully situated on ground rising gradually as it is removed from the river, and from this high ground a view is obtained over a wide expanse of country. The public buildings include a city hall, public library, 15 churches and 6 school buildings. There are electric lights, electric street-railways, macadamized streets, water-works, fire and police departments, banks, clubs, two daily, one semiweekly and three weekly newspapers. The leading industries of the city are foundries and print-works, manufactories of woolens and shoddy, whips, india-rubber and chemicals. The Passaic River, on which the city of Passaic is situated, after rising in Morris County runs southeastward a short distance, then northeastward, forming the boundary between Essex and Morris counties enters Passaic County, and, after passing Paterson, where its course is marked by a fall of 72 feet, making attractive scenery and furnishing water-power for many factories, it flows south and empties into Newark Bay, three miles below Newark. It has a course of about one hundred miles, navigable a short distance from its mouth. Population 1890, 13,028; 1895, 17,894.

PASSAMAQUODDY BAY, an inlet opening out of the Bay of Fundy, forming part of the boundary between Maine and New Brunswick, having a length of about twelve miles and a width at the entrance of eight miles. It receives the St. Croix, Dideguash, and other rivers; is deep, sheltered, and incloses several islands, of which Deer and Campobello have good harbors. The bay is the seat of important fisheries, is surrounded by picturesque scenery, and has tides averaging 25 feet in height.

PASSAVANT, WILLIAM ALFRED, an American clergyman and philanthropist; born in Zelenople, Pennsylvania, Oct. 9, 1821; graduated at Jefferson College, Canonsburg (1840), and at the Lutheran Theological Seminary, Gettysburg (1842); held pastorates in Baltimore, Maryland (1842-44) and Pittsburgh, Pennsylvania (1844-55). He founded hospitals in Pittsburgh, Pennsylvania; Milwaukee, Wisconsin; Chicago and Jacksonville, Illinois; and orphanages in Rochester, Pennsylvania; Zelen-

ople, Pennsylvania; and Mt. Vernon, New York. He was instrumental in establishing Thiel College, at Greenville, Pennsylvania, in 1870, and the Lutheran Theological Seminary, in Chicago, in 1891. He organized the missionary work of the Lutheran Church in the United States and the general council of the Lutheran Church in America; founded *The Missionary*, in Pittsburg, Pennsylvania, in 1845, which he edited, and when it was united with the *Lutheran* in Philadelphia, Pennsylvania, in 1861, became co-editor; also founded, in 1880, *The Workman*, in Pittsburg, Pennsylvania, and was its editor until 1887. Although an eminent preacher, his chief work was in organizing benevolent and Christian institutions. He died June 3, 1894.—His son, WILLIAM ALFRED, Jr., a clergyman; born in Pittsburg, Pennsylvania, Jan. 23, 1857; educated at Western University, Pittsburg, and Muhlenberg College and Theological Seminary, Philadelphia; he entered the ministry in 1879, and became pastor at Baden and Pittsburg, Pennsylvania. He became editor of *The Workman* in 1887, and superintendent of English Home Missions of the General Council in 1889. Upon the death of his father, in 1894, he succeeded him in the care of the established benevolent institutions.

PASS CHRISTIAN, a town of Harrison County, southern Mississippi, on Mississippi Sound, 58 miles E.N.E. of New Orleans, Louisiana, and 82 miles W.S.W. of Mobile, Alabama, and on the Louisville and Nashville railroad. Within recent years Pass Christian has become one of the largest health and winter resorts on the gulf. Along a water-front of six miles runs a shell-paved avenue, shaded by live-oaks and magnolias, and into the sound project piers for fishing and promenading. During the winter the prevailing breezes are off the Gulf of Mexico, and the temperature averages 60° F. The town has several large hotels, and numerous cottages and boarding-houses. Resident population 1890, 1,705.

PASSENGER—PIGEON. See PIGEON, Vol. XIX, pp. 84, 85.

PASSERES, the largest order of birds, including one half of all birds. There are over five thousand species. There are two suborders, *Oscines* and *Clamatores*. The group is equivalent to the group *Coracomorpha*, and almost equivalent to *Insectores*. See SPARROW, Vol. XXII, p. 369.

PASSERINE BIRDS. See ORNITHOLOGY, Vol. XVIII, pp. 40, 41.

PASSION—FLOWER FAMILY. See PASSION-FLOWER, Vol. XVIII, pp. 342, 343.

PASSIONISTS, a religious congregation of priests of the Roman Catholic Church, the object of whose institute, indicated by their name, is to preach "Jesus Christ and Him crucified." The founder, St. Paul of the Cross, was born in 1694, near Genoa, obtained the sanction of Benedict XIV in 1741, and died at the mother-house of the society on the Cœlian Hill at Rome in 1775. The cross appears everywhere as their emblem, and a large crucifix forms a part of their very striking costume. For a time the congregation remained in obscurity; but in the first half of the nineteenth century it rose into

notice. In 1842 it secured a footing in England. The American province, begun in 1852, numbers between one hundred and two hundred religious houses.

PASSION—PLAYS. See DRAMA, Vol. VII, pp. 414, 415.

PASSIVITY OF METALS. Some metals, such as iron, cobalt, nickel, and perhaps others, treated with a strong oxidizing agent, such as concentrated nitric or chromic acid, are no longer acted on by acids or many other reagents that usually attack them. This is probably due to the formation of a thin layer of oxide, which protects the rest of the metal. If the passive metal is heated in a reducing-gas, or rubbed or put in an acid in contact with platinum, it becomes active again. Gun-barrels are made passive to protect them from rusting. See ELECTROLYSIS, Vol. VIII, p. 109.

PASSPORTS. The use of passports in continental Europe and in times of peace has become much more infrequent of late years. But there are many advantages in possessing one in case of any accident or mishap to a traveler. The European law and practice is concisely stated under PASSPORT, q.v., Vol. XVIII, p. 344. The Department of State in America is charged with the issuance of passports. Its regulations and required formalities are briefly as follows:

Passports are issued only to citizens of the United States, upon application, supported by proof of citizenship. When the applicant is a native citizen of the United States he must transmit his own affidavit of this fact, stating his age and place of birth, with the certificate of one other citizen of the United States to whom he is personally known, stating that the declaration made by the applicant is true. The affidavit must be attested by a notary public, under his signature and seal of office. When there is no notary in the place, the affidavit may be made before a justice of the peace or other officer authorized to administer oaths; but if he has no seal, his official act must be authenticated by certificate of a court of record. A person born abroad who claims that his father was a native citizen of the United States must state in his affidavit that his father was born in the United States, has resided therein, and was a citizen of the same at the time of the applicant's birth. This affidavit must be supported by that of one other citizen acquainted with the facts.

If the applicant be a naturalized citizen, his certificate of naturalization must be transmitted for inspection (it will be returned with the passport), and he must state in his affidavit that he is the identical person described in the certificate presented. Passports cannot be issued to aliens who have only declared their intention to become citizens. Military service does not of itself confer citizenship. A person of alien birth, who has been honorably discharged from military service in the United States, but who has not been naturalized, should not transmit his discharge-paper in application for a passport, but should apply to the proper court for admission to citizenship, and transmit the certificate of naturalization so obtained. The signature to the application and oath of allegiance should conform in orthography to the applicant's name as written in the naturalization paper, which the department follows. Every applicant is required to state his occupation and the place of his permanent legal residence, and to declare that he goes abroad for temporary sojourn and intends to return to the United States with the purpose of residing and performing the duties of citizenship therein. The wife or widow of a naturalized citizen must transmit the naturalization certificate of the husband, stating in her affidavit that she is the wife or widow of the person described therein. The children of a naturalized citizen claiming citizenship through the father must transmit the

certificate of naturalization of the father, stating in their affidavits that they are children of the person described therein, and were minors at the time of such naturalization. The oath of allegiance to the United States will be required in all cases.

The application should be accompanied by a description of the person, stating the following particulars, viz.: Age:—years. Stature:—feet—-inches (English measure). Forehead:—. Eyes:—. Nose:—. Mouth:—. Chin:—. Hair:—. Complexion:—. Face:—. If the applicant is to be accompanied by his wife, minor children, or servants, it will be sufficient to state the names and ages of such persons and their relationship to the applicant, when a single passport for the whole will suffice. For any other person in the party a separate passport will be required. A woman's passport may include her minor children and servants.

By act of Congress approved March 23, 1888, a fee of one dollar is required to be collected for every citizen's passport. That amount in currency or postal note should accompany each application. Orders should be payable to the disbursing clerk of the Department of State. Drafts or checks are inconvenient and undesirable. A passport is good for two years from its date, and no longer. A new one may be obtained by stating the date and number of the old one, paying the fee of one dollar, and furnishing satisfactory evidence that the applicant is at the time within the United States. The oath of allegiance must also be transmitted when the former passport was issued prior to 1861. Citizens of the United States desiring to obtain passports while in a foreign country must apply to the chief diplomatic representative of the United States in that country, or, in the absence of a diplomatic representative, then to the consul-general, if there be one, or, in the absence of both the officers last named, to a consul. Passports cannot be lawfully issued by state authorities, or by judicial or municipal functionaries of the United States. (Revised Statutes, section 4075.) To persons wishing to obtain passports for themselves, blank forms of application will be furnished by the Department of State on request, stating whether the applicant be a native or naturalized citizen, or claims citizenship through the naturalization of husband or parent. Communications should be addressed to the Department of State, indorsed, "Passport Division," and each communication should give the postoffice address of the person to whom the answer is to be directed. Professional titles will not be inserted in passports. Persons applying for blank forms for passports should state whether the forms are required for native or naturalized citizens, as there are several forms, each different to meet the case required, and it will often save time and trouble if this caution is observed.

Passports are necessary for the Turkish dominions, including Egypt and Palestine, and must be certified by a Turkish consular officer before entering Turkish jurisdiction. Persons quitting the United States with eventual purpose of visiting any part of Turkey, are advised that their passports may conveniently be certified in advance by the consul-general of Turkey at New York, thus avoiding possible difficulty in obtaining the prescribed *visa* in another country *en route*.

Persons traveling with United States passports desirous of entering Germany from France should not neglect to have their passports viséed by the consul-general of Germany at Paris, thus possibly saving themselves much inconvenience and delay.

It is also understood that in many of the large cities of Germany passports are required of all foreigners who therein take up even a short residence.

PASTA, GIUDITTA JUDITH, an Italian opera-singer; born of Jewish parents in Como, near Milan, April 9, 1798; educated in music in Como and at the

Conservatoire, in Milan; married Pesta, a singer. Her first triumph was at Verona, in 1822. The next year she appeared at the Paris Italian Opera, where her singing was greatly admired. From 1825 to 1833 she sang in London, Paris and other cities. Her magnificent voice passed easily from the highest soprano notes to the gravest contralto tones; in addition she possessed fine dramatic power. *La Sonnambula* was written for her by Bellini; her principal rôles were Medea, Desdemona, Semiramide, Nina, Camilla, and Giulia in *Romeo e Giulia*. She retired from the stage in 1834, and died April 1, 1865.

PASTELS OR PASTILS. See CRAYON, Vol. VI, P. 555.

PASTEUR, LOUIS, a French chemist and biologist; born in Dôle, in the department of Jura, Dec. 27, 1822; received the degree of D.Sc. from the École Normale in 1847; professor of physics in the Faculty of Sciences, Strasburg, in 1849; dean of the Faculty of Sciences at Lille in 1854; "scientific director" of the École Normale, Paris, in 1857; professor of geology, physics and chemistry at the École des Beaux-Arts, Paris, in 1863; professor of chemistry at the Sorbonne in 1867. His work in molecular chemistry won him the Jecker prize in 1861; but he is noted chiefly for his discoveries in the chemistry of fermentation (see FERMENTATION, Vol. IX, pp. 95, 96) and in mycology (see SCHIZOMYCETES, Vol. XXI, p. 400). He ascertained the causes of certain deteriorations of wine, and found a preventive. His investigation of the disease of the silk-worm resulted in finding both the cause and the cure (see SILK, Vol. XXII, p. 59). He discovered the bacilli which cause anthrax in cattle, and a cure by inoculation (see MURRAIN, Vol. XVII, p. 59). He found the cause of hydrophobia to be a microbe in the nerve-centers, and its preventive and cure in the employment of an attenuated or "cultured" form of the same microbe (see RABIES, Vol. XX, p. 202). In 1888 he established the Pasteur Institute in Paris for the treatment of rabies, which was opened in the presence of President Carnot. In 1890 a hospital for the treatment of rabies by the Pasteur method was founded in New York City. In recognition of his services to science and industry he received in 1872 a prize of 10,000 florins from the Austrian Ministry of Agriculture; in 1873 one of 12,000 francs from the Société d'Encouragement; and in 1874 a life-pension of 12,000 francs from the French government. He was elected a member of the London Royal Society in 1869, and of the French Academy of the Institute of France in 1881. His seventieth birthday was celebrated before a brilliant official assembly at the Sorbonne, in 1892. He contributed many articles to scientific periodicals, and wrote *Nouvel Exemple de Fermentation* (1863); *Études sur le Vin* (1866); *Études sur le Vinaigre* (1868); *Études sur la Maladie*



LOUIS PASTEUR.

des Vers de Soie (1870); *Les Microbes* (1878). He died Sept. 28, 1895.

PASTOR, a bird. See STARLING, Vol. XXII, pp. 457, 458.

PATAPSCO RIVER. See MARYLAND, Vol. XV, p. 603.

PATCHOGUE, a village of Suffolk County, southeastern New York, on Great South Bay on the southern shore of Long Island, 53 miles E. of New York City, and on the Long Island railroad. It has a harbor with good dock facilities, and is one of the most popular resorts on the Long Island coast. The most important industries are the taking and exporting of fish and oysters, ship-building and manufacture of lace, crape, paper, flour, sash and doors. The village was incorporated in 1893, and had an estimated population of 4,000 in 1894.

PATELLA or KNEE-PAN. See ANATOMY, Vol. I, p. 829.

PATELLIDÆ. See MOLLUSCA, Vol. XVI, pp. 645-648.

PATENT LAWS AND SYSTEM OF THE UNITED STATES, THE. Nearly every civilized nation has provided in a greater or lesser degree for the encouragement and protection of inventive skill and industry, and in some of the older European countries for generations exclusive privileges have been granted to the producers of things new and useful in art, science, literature and mechanics. The article on PATENTS, Vol. XVIII, pp. 354-358, being practical and present rather than historical, dealt with the English patent law and practice, and was restricted to a brief mention of the existing laws of America in this regard.

In colonial days the restrictive policy of the mother-country operated disastrously on patents as well as manufactures, and in consequence the



THE PATENT OFFICE, WASHINGTON, D. C.

American colonies had made little progress in arts or manufactures up to the signature of the Declaration of Independence. England's emissaries, the royal governors of colonies, were charged with the repression of every industry liable to enter into competition with the artisans at home. Nearly everything had to be imported in exchange for raw agricultural products, and rarely indeed were exclusive manufacturing privileges granted to exceptionally favored colonists in New England. Intercolonial trade was hampered and exportation to the West Indies stopped. Even the Bible was not to be printed in America. There was warrant enough for the words of the

Declaration as to "cutting off our trade with all parts of the world." Few, indeed, could be classed under Andrew Marvell's (q.v., Vol. XV, pp. 588, 589) humorous *Character of Holland*, where

"To make a bank was a great plot of state;
Invent a shovel, and be a magistrate."

Even under this blighting influence, a forecast of America's prominence in inventive genius is to be found in the first recorded patent, granted to Joseph Jenks, of Lynn, Massachusetts, by special act of the General Court of Massachusetts Bay Colony, May 6, 1646. It related to improvements in water-mills, the making of scythes, and to improvements in saw-mills; and was followed in May, 1655, by another patent to the same inventor in respect to scythes. But there were few inventors and fewer patents until the first notes of the peal of liberty rang throughout the land.

FOUNDATION OF THE AMERICAN PATENT SYSTEM. Upon the experience and practical workings of the various systems of the Old World the American laws and practice have been founded, the English theories entering most largely into them. Prior to the adoption of the Federal Constitution, some of the states or provincial governments granted to inventors exclusive privileges, but for obvious reasons these were of little or no value. The foundation of the Republic, and the adoption in 1788 of a constitution wherein and whereby Congress was empowered "to promote the progress of science and useful arts by securing, for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries," were the first real steps toward the United States system of patents. Legislation soon ensued to shape generalities into practical form, and by an act of Congress, approved April 10, 1790, the first American patent system was founded. Thomas Jefferson inspired it, and may be said to have been the father of the American Patent Office. He took great pride in it, it is said, and gave personal consideration to every application that was made for a patent during the years between 1790 and 1793, while the power of revision and rejection granted by that act remained in force. It is related that the granting of a patent was held to be in these early times quite an event in the history of the State Department, where the clerical part of the work was then performed. It is a matter of tradition that when an application for a patent was made under the first act, Jefferson would summon Henry Knox of Massachusetts, who was Secretary of War, and Edmund Randolph of Virginia, who was Attorney-General, these officials being designated by the act, with the Secretary of State, as a tribunal to examine and grant patents; and that these three distinguished officials would examine the application critically, scrutinizing each point of the specification and claims carefully and rigorously. The result of this examination was, that during the first year a majority of the applications failed to pass the ordeal, and only three patents were granted. In those days every step in the issuing

of a patent was taken with great care and caution, Jefferson seeking always to impress upon the minds of his officers and the public that the granting of a patent was a matter of no ordinary importance. During the year 1791, 33 patents were granted; in 1792 the number was 11; and in 1793, 20—making 67 in all under the first statute.

The law of 1790, laying the foundation of the patent-system, constituted a tribunal consisting of the Secretary of State, the Secretary of War and the Attorney-General of the United States, whose duty it was, according to the language of the act, "to grant patents for any such useful art, manufacture, engine, machine or device as they should deem sufficiently useful and important." This language in the act was held to give this board authority to refuse patents for want of novelty in invention or insufficiency of utility or importance, which authority was, as before remarked, exercised with great rigor.

The first act required that patents should not be granted for more than fourteen years, and there was no provision for an extension. It required that "a written specification be filed with the Secretary of State, containing a description of the article desired to be patented, accompanied with drafts or models, and explanations and models." It also required that the specification should be so particular, and the models so exact, as not only to distinguish the invention or discovery from other things before known and used, but also to enable a workman or other person skilled in the art or manufacture whereof it was a branch, or wherewith it might be nearest connected, to make, construct or use the same, to the end that the public might have the full benefit thereof after the expiration of the patent term. This law also directed the Secretary of State to furnish copies of any such specification, and to permit any such models to be copied by any person making application therefor. The act also provided for the repeal of any patent obtained surreptitiously or by false suggestion, and that in all suits brought for the repeal of a patent so obtained, the original patent or specifications should be *prima facie* evidence of priority of invention. It provided no remedy for interfering applications, and apart from the thorough inspection it required it was, read by the light of the present practice, exceedingly defective. It was in many respects more equitable to all classes than the law which superseded it. There was no provision for an appeal from the decision of the tribunal above named by the act of 1790, and the strictness with which it exercised its powers was the cause of serious complaint. Inventors contended that these officers exercised arbitrary powers, and that they were, by education and interest, hostile to the classes who sought the benefits of the patent law.

There is no doubt but that this was true to a greater or less extent; or rather, it is true that they reluctantly granted patent privileges from a well-settled conviction that a too liberal exercise of that power would be detrimental to the inter-

ests of the country. Mr. Jefferson, however, if not his associates, held to the view that the patent law was not framed to collect revenue, but to encourage the production of something new and useful, and therefore believed in dealing liberally with those to whom patent rights were granted. The act of 1790 prescribed the following fees for the granting of patents, which are in striking contrast with those exacted by the act of 1793, which was framed by those who were supposed to favor the classes seeking patent privileges: "For receiving and filing the petition, fifty cents; for filing specifications, per copy-sheet containing one hundred words, ten cents; for making out the patent, two dollars; for affixing the great seal, one dollar; for indorsing the day of delivering the same to the patentee, including all intermediate services, twenty cents." When the patent under this act had passed the ordeal of the board, it still required the certificate of the Attorney-General and the signature of the President to make it complete. The impetus given to inventive genius by the act of 1790 created interests hostile to the power of revision and rejection which it authorized, and so rapidly did they develop that in 1793, by the act of February 24th, this power was destroyed, much to the detriment of the material interests of the country.

Just who drew the act of 1793 is not known, but that it met with Mr. Jefferson's opposition is a matter of history. It is said that he pointed out the consequences which would result from breaking down the barriers thrown around the granting of patents by the act of 1790, and held that the promiscuous granting of exclusive privileges, or "the creation of monopolies," as he called them, in any art or industry, was against the theory of popular government and pernicious in its effects. After the act of 1793 became a law, the control of the patent business still continued in the State Department.

There were remarkable differences between the two statutes. The act of 1790 made no distinction between citizens of the United States and aliens as to their rights under the patent law, but the act of 1793 refused patents to persons not citizens of the United States. By an act passed April 17, 1800, the law was so amended as to give aliens who had resided two years in this country the same rights as citizens, provided they filed an affidavit with their application, setting forth their desire and inclination to become citizens of the United States. The act of 1793 was in general construction much the same as that of 1790, except that the power of rejection was destroyed and the duty of granting patents lodged with the Secretary of State alone. It still required, however, the certificate of the Attorney-General as to the correctness of form to be affixed, and also the signature of the President. This statute provided that interfering applications should be submitted to the arbitration of three persons, one of whom was to be chosen by each of the applicants and the third to be appointed by the Secretary of State. The decision

of this tribunal was to be final, and if either party refused to go into arbitration the patent was to issue to the opposing party. There was no provision for an extension of a patent.

During the years from 1790 to 1802 a single clerk in the State Department performed the work of the Patent Office, and a dozen pigeon-holes contained the entire records. In that year quite a noted scientific gentleman named Dr. Thornton was appointed by Mr. Jefferson to the office, and he was thereafter styled its "superintendent." For twenty-six years he was the autocrat of the Patent Office, and some amusing stories are related as to his management of its affairs. An official of the department relates that during his superintendence he conceived himself to be invested with much discretionary power, for he held to the maxim that "the patent-law was made solely for the encouragement of authors and inventors, and not to collect revenue." He would therefore exercise his judgment about the payment of fees, the result being that after his death there was quite a deficit between the amount that was and that which should have been to the credit of the patent fund in the treasury. During Dr. Thornton's administration of the office it was no unusual thing to find the doctor a co-patentee, while he was determining all questions which might arise under the law and the practice which he himself dictated.

Dr. Thornton took great interest in the office, and he dictated its action with a power that knew no master. The duties of his position not being onerous, he conducted an extended correspondence upon scientific subjects with the patent officials of the Old World and scientists generally, which he left as a part of the archives of the office when he died, "as a monument of his fidelity to and interest in the advancement of American mechanics." A story is told of him that during the War of 1812, when the British captured the city of Washington and destroyed the capitol building, a loaded cannon was trained upon the Patent Office for the purpose of destroying it, and he is said to have put himself before the gun, and in a frenzy of excitement exclaimed: "Are you Englishmen, or only Goths and Vandals? This is the Patent Office, a depository of the ingenuity and inventions of the American nation, in which the whole civilized world is interested. Would you destroy it? If so, fire away, and let the charge pass through my body." The effect is said to have been magical upon the soldiers, and to have saved the Patent Office from destruction.

A Mr. Jones succeeded Dr. Thornton as superintendent of the Patent Office, and from 1828 till 1830 administered its affairs. Dr. J. D. Craig succeeded to the position in the last-named year, and remained until 1836.

On the 28th of April, 1810, Congress passed an act authorizing the President to erect or procure by purchase a building suitable for the accommodation of the general postoffice and of the "office of the keeper of the patents," in such situation

and finished in such manner as the interests of the United States and the safety and the convenience of those officers, respectively, and the arrangement of the models in the Patent Office should, in his opinion, require. The sum of \$20,000 was appropriated for the purposes expressed in the act, and a building purchased on the site now occupied by the Postoffice Department. By act of March 7, 1812, a further appropriation of \$9,553.91 was made to repair it. Previous to this time the Patent Office was in the building at present occupied by the War Department, and even at this early day so important a branch of the public service had it become that it was deemed best to provide more space for it. In 1812 it was removed to a building standing on the site occupied by the present Postoffice Department building, where it remained until destroyed by fire in 1836.

During the years from 1790 to 1812, inventors confined themselves almost wholly to agricultural and commercial objects. Implements for tilling the soil and converting its products, and machinery for navigation, attracted most attention. Manufactures, except of a purely domestic character for domestic purposes, were hardly known. The arts were poorly understood and little cultivated. The necessities of the New World drove its enterprise into other channels, and its people looked to Europe for manufactured products not directly connected with the necessities of life or demanded by the development of its commerce and agriculture. The War of 1812, however, forced our people to attempt production in many branches of manufacture and industry heretofore almost wholly uncultivated, and the result was the most remarkable development of human ingenuity ever known to any age or country. It is a source of great regret that no well-preserved history of American inventions dating from this time is in existence, and that no classified list of models which were in the office at the time of the fire in 1836 can be obtained. The earliest date that can be reached is Jan. 21, 1823, and that is only partially complete, but it gives the number in the most important classes as follows:

LIST OF MODELS IN THE PATENT OFFICE, JAN. 21, 1823.

Propelling-boats	38
Carding-machines	8
Making carriage-wheels	4
Plows	65
Threshing-machines	20
Winnowing-machines	25
Bridges	13
Sawmills	26
Water-mills	17
Windmills	7
Water-wheels	26
Pumps	66
Presses	56
Looms	45
Stocking-loom	3
Spinning-machines	28
Fire-engines	10
Steam-mills	14
Nail-cutting machines	95
Machines for making barrels, etc.	1
Mud-machines	7
Flax-dressing machines	6

File-cutting machines -----	6
Machines for cutting dye-woods -----	6
Cloth-shearing machines -----	16
Straw-cutting machines -----	10
Boring-machines -----	3
Locks -----	12
Guns -----	2
	635
For various other purposes -----	1,184
Total -----	1,819

These models were classified as follows:

I.—*Agriculture*. Plows, harrows, cultivators, planting, seeding, mowing and threshing machines, rakes, wheat-fans, straw-cutters, etc.

II.—*Factory Machinery*. For cotton, wool, flax, hemp, paper-rolling and slitting-mills, nail-cutters, etc.

III.—*Navigation*. Ships, boats, marine railways, canal-locks, mud-machines, dry-docks, etc.

IV.—*Land Works*. Railways, roads, bridges, excavating and boring machines, pile-engines, etc.

V.—*Common Trades*. Brick-making and planing machines, trip-hammers, bellows, turning-lathes, chains, washing-machines, household furniture and utensils; also, boots, shoes, saddles, harness, etc.

VI.—*Wheel Carriages*. Coaches, chairs, wagons, carts, waywisers, mail-bags, boats, etc.

VII.—*Hydraulics*. Pumps, fire-engines, hose-valves, etc.

VIII.—*Caloric and Steam Apparatus*. Furnaces, fire-places, stoves, boilers, stills, steam-engines, etc.

IX.—*Mills*. Water and other wheels, grist-mills, saw-mills and the various parts of their machinery.

X.—*Lever and Screw Power*. Applied to printing, coining and other presses.

XI.—*Arms*. Cannons, mortars, muskets, rifles, pistols, percussion and other locks, swords, etc.

XII.—*Mathematical Instruments*. For surveying, mining and nautical purposes.

XIII.—*Chemical Compositions*. Patent medicines, cements, dyes, etc.

XIV.—*Fine Arts*. Musical instruments, paints, varnishes, gildings, sculpture, architecture and gardening.

From 1790 to the re-organization of the Patent Office in 1836 there were granted 11,348 patents, a large number of which, on account of lack of novelty or usefulness, were valueless, but among them were some of the most important inventions of the age. The abuses which grew out of the promiscuous granting of patents without further inquiry than as to the payment of the fee and the form of the application, attracted public attention in the early part of the present century, but it was not until 1836 that opposition to this system was strong enough to invoke Congressional action. Early in that year Senator Ruggles, of Maine, who was the early champion of a reform of the abuses which the act of 1793 made possible, moved in the Senate for "a select committee of five to take into consideration the state and condition of the Patent Office and the laws relating to the issuing of patents for new and useful inventions and discoveries." The committee was appointed, and on the 28th day of April, of the same year, made an extended report, setting forth the abuses which had grown up as a necessary consequence of the act of 1793, and presented a bill for a re-organization of the Patent Office, which became a law on July 4, 1836.

The number of patents granted each year from 1790 to July 4, 1836, is as follows:

In 1790, 3; in 1791, 33; in 1792, 11; in 1793,

20; in 1794, 22; in 1795, 12; in 1796, 44; in 1797, 51; in 1798, 28; in 1799, 44; in 1800, 41; in 1801, 44; in 1802, 65; in 1803, 97; in 1804, 84; in 1805, 57; in 1806, 63; in 1807, 99; in 1808, 158; in 1809, 203; in 1810, 223; in 1811, 215; in 1812, 238; in 1813, 181; in 1814, 210; in 1815, 173; in 1816, 206; in 1817, 174; in 1818, 222; in 1819, 156; in 1820, 155; in 1821, 168; in 1822, 200; in 1823, 173; in 1824, 228; in 1825, 204; in 1826, 323; in 1827, 331; in 1828, 368; in 1829, 447; in 1830, 544; in 1831, 573; in 1832, 474; in 1833, 586; in 1834, 630; in 1835, 757; in 1836, 723.

The fees which were the results of this business had accumulated a surplus in the treasury, on Jan. 1, 1837, to the credit of the patent fund over and above all expenses incurred, of \$156,907.73.

In remarkable contrast to the above results stands the record of business transacted by the office after its re-organization in 1836. The statement for the period extending from 1837 to 1896 is as follows:

The rapid increase of the patent business since 1836 can be readily seen by a comparison of the figures given in the two statements of the business of the office. From 1790 to 1837, a period of 46 years, 11,445 patents were granted, yielding a profit to the office of \$156,907.73. From Jan. 1, 1837, to Sept. 30, 1877, a period of about 41 years, there were issued 192,332 patents, including reissues, which, together with the other business, placed to the credit of the patent fund on Sept. 30, 1877, \$1,099,940.41.

From 1793 to 1868 the moneys earned by the Patent Office were kept as a separate fund in the Treasury, known as "the patent fund." The Commissioner of Patents drew against it for the expenses of his office, and the surplus, over and above the expenses, was kept intact and credited to this fund, and permitted to accumulate. On July 20, 1868, Congress passed an act "that all money to the credit of the patent fund, or in the hands of the Commissioner of Patents, and all moneys thereafter received at the Patent Office, for any purpose or from any source whatever, shall be paid into the treasury as received, without any deduction whatever." By this act the accumulation of the profits of the Patent Office for 75 years was turned into the common fund of the Treasury, and appropriations made for its support the same as for the other departments of the government. Although a separate account is kept with the Patent Office, there is no fund now intact in the Treasury representing its accumulations and known as "the patent fund."

PROVISIONS OF THE LAW OF 1836. The committee appointed by the Senate in 1836 presented with its report a bill for the re-organization of the Patent Office, which became a law on the 4th of July of the same year.

By this statute the Patent Office was created a bureau of the Department of State, whose chief officer was to be called Commissioner of Patents; he was to be appointed by the President, by and with the advice and consent of the Senate.

COMPARATIVE STATEMENT OF THE BUSINESS OF THE OFFICE FROM 1837 TO 1896, INCLUSIVE.

YEAR.	APPLICATIONS.	CAVEATS FILED.	PATENTS AND REISSUES.	CASH RECEIVED.	CASH EXPENDED.	SURPLUS.
1837			435	\$ 29,289.08	\$ 33,506.98	
1838			520	42,123.54	37,338.92	\$ 4,784.62
1839			425	38,019.97	34,543.51	3,476.46
1840	765	228	473	38,056.51	39,020.67	
1841	847	312	495	40,413.01	52,666.87	
1842	761	291	517	36,505.63	31,241.73	5,264.20
1843	819	315	519	35,315.81	30,776.96	4,538.85
1844	1,045	380	497	42,509.26	36,344.53	6,164.73
1845	1,246	452	503	51,076.14	39,395.65	11,680.49
1846	1,272	448	638	50,264.16	46,158.71	4,105.45
1847	1,531	533	569	63,111.19	41,878.35	21,232.84
1848	1,628	607	653	67,576.69	58,905.84	8,670.85
1849	1,955	595	1,077	80,752.78	77,716.44	3,036.34
1850	2,193	602	993	86,927.05	80,100.95	6,826.10
1851	2,258	760	872	95,738.61	86,916.93	8,821.68
1852	2,639	996	1,019	112,056.34	95,916.91	16,139.43
1853	2,673	901	961	121,527.45	132,869.83	
1854	3,324	868	1,844	163,789.84	167,146.32	
1855	4,435	906	2,013	216,459.35	179,540.33	36,919.02
1856	4,960	1,024	2,505	192,588.02	199,931.02	
1857	4,771	1,010	2,896	196,132.01	211,582.09	
1858	5,364	943	3,710	203,716.16	193,193.74	10,522.42
1859	6,225	1,089	4,538	245,942.15	210,278.41	35,663.74
1860	7,653	1,084	4,819	256,352.50	252,820.80	3,531.79
1861	4,643	700	3,340	137,354.44	221,491.91	
1862	5,038	824	3,521	215,754.99	182,810.39	32,944.06
1863	6,014	787	4,170	195,593.29	189,414.14	6,179.15
1864	6,972	1,063	5,020	240,919.98	229,868.00	11,051.98
1865	10,664	1,937	6,616	348,791.84	274,199.34	74,592.50
1866	15,269	2,723	9,450	495,665.38	361,724.28	133,941.10
1867	21,276	3,597	13,015	646,581.92	639,263.32	7,318.60
1868	20,445	3,705	13,378	681,565.86	628,679.77	52,886.09
1869	19,271	3,624	13,986	693,145.81	486,430.74	206,715.07
1870	19,171	3,273	13,321	669,456.76	557,147.19	112,309.57
1871	19,472	3,366	13,033	678,716.46	502,091.64	116,624.82
1872	18,246	3,090	13,590	699,726.39	665,595.00	34,131.39
1873	20,414	3,248	12,864	703,191.77	691,178.98	12,012.79
1874	21,602	3,181	13,599	738,278.17	679,288.41	58,989.76
1875	21,638	3,094	14,837	743,453.36	721,657.71	21,795.65
1876	21,425	2,697	15,595	757,987.65	652,542.60	105,445.05
1877	20,308	2,809	14,187	732,342.85	613,152.62	119,190.23
1878	20,260	2,755	13,444	725,375.55	593,082.89	132,292.66
1879	20,059	2,620	13,213	703,931.47	529,638.97	174,292.50
1880	23,012	2,490	13,947	749,685.32	538,865.17	210,820.15
1881	26,059	2,406	16,584	853,665.89	605,173.28	248,492.61
1882	31,522	2,553	19,267	1,009,219.45	683,867.67	325,351.78
1883	34,576	2,741	22,383	1,146,240.00	675,234.86	471,005.14
1884	35,600	2,582	20,413	1,075,798.80	970,579.76	105,219.04
1885	35,717	2,552	24,233	1,188,089.15	1,024,378.85	163,710.30
1886	35,968	2,513	22,508	1,154,551.40	992,503.45	162,047.95
1887	35,613	2,622	21,477	1,144,509.60	994,472.22	150,037.38
1888	35,797	2,251	20,506	1,118,516.10	973,108.78	145,407.32
1889	40,575	2,481	24,158	1,281,728.05	1,052,955.96	228,772.09
1890	41,048	2,311	26,292	1,340,372.66	1,099,297.74	241,074.92
1891	40,552	2,408	23,244	1,271,285.78	1,139,713.35	131,572.43
1892	40,753	2,290	23,559	1,286,331.88	1,110,739.24	175,592.59
1893	38,473	2,247	23,769	1,242,871.64	1,141,038.45	101,833.19
1894	38,439	2,286	20,867	1,187,439.58	1,100,047.12	87,392.46
1895	40,680	2,415	22,057	1,245,246.93	1,084,496.51	160,750.42
1896	41,660	2,460	22,791	1,307,090.30	1,097,368.85	209,721.45

By the same act a chief clerk of the Patent Office was provided for, who was to have custody of the seal and of the records and models of the office, and was to perform all the duties of the Commissioner during his absence.

It also provided for an examining clerk at a salary of \$1,500 a year, whose duties were the same as those of a principal examiner at present. Two clerks at \$1,200 each and one at \$1,000 were provided for, and also a machinist at \$1,250 and a messenger at \$700. The commissioner and

chief clerk were both required to give bonds for the faithful performance of the duties of their office. Under this statute patents were to be issued for a term not exceeding 14 years, the fee for the same being \$30. The patents might be extended for a period of seven years upon payment of an additional sum of \$30, if the Secretary of State, the Commissioner of Patents and the Solicitor of the Treasury, who were by the act appointed a board to hear and decide upon the evidence for or against the extension, should

decide favorably. Notice of the extension was to be published in a Washington newspaper, and the board was to sit at the time and place given in the notice. This statute provided nearly the same regulations in relation to specifications, drawings and models as the original act of 1790. The same oath or affirmation as to the originality of the inventions was also preserved. The most important feature of all was, however, the system of examination into novelty and usefulness which this act provided, and which has had such marked influence upon the patent interests of the country.

This section of the law provided "that the Commissioner shall make, or cause to be made, an examination of the alleged new invention or discovery; and if, on any such examination, it shall not appear to the Commissioner that the same had been invented or discovered by any other person in this country prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or any foreign country, or had been in public use or on sale with the applicant's consent or allowance prior to the application, if the Commissioner shall deem it to be sufficiently useful and important it shall be his duty to issue a patent therefor. But whenever, on such examination, it shall appear to the Commissioner that the applicant was not the original and first inventor or discoverer thereof, or that any part of that which is claimed as new had before been invented or discovered or patented or described in any printed publication in this or any foreign country, as aforesaid, or that the description is defective and insufficient, he shall notify the applicant thereof, giving him briefly such information and references as may be useful in judging of the propriety of renewing his application, or of altering his specification to embrace only that part of the invention or discovery which is new. In every such case, if the applicant shall elect to withdraw his application, relinquishing his claim to the model, he shall be entitled to receive back twenty dollars, part of the duty required by this act, on filing a notice in writing of such election in the Patent Office, a copy of which, certified by the Commissioner, shall be a sufficient warrant to the Treasurer for paying back to the said applicant the said sum of twenty dollars. But if the applicant in such case shall persist in his claim for a patent, with or without any alteration of his specification, he shall be required to make oath or affirmation anew in manner as aforesaid; and if the specification and claim shall not have been so modified as, in the opinion of the Commissioner, shall entitle the applicant to a patent, he may, on appeal and upon request in writing, have the decision of a board of examiners, to be composed of three disinterested persons, who shall be appointed for that purpose by the Secretary of State, one of whom, at least, to be selected, if practicable and convenient, for his knowledge and skill in the particular art, manufacture, or branch of science to which the alleged invention appertains, who shall be under oath or affirmation for the faithful and impartial performance of the duty imposed upon them by said appointment. Said board shall be furnished with a certificate in writing of the opinion and decision of the Commissioner, stating the particular grounds of his objection, and the part or parts of the invention which he considers as not entitled to be patented; and the said board shall give reasonable notice to the applicant, as well as to the Commissioner, of the time and place of their meeting, that they may have an opportunity of furnishing them with such facts and evidences as they may deem necessary to a just decision; and it shall be the duty of the Commissioner to furnish to the board of examiners such information as he may possess relative to the matter under their consideration; and on an examination and consideration of the matter by such board, it shall be in their power, or of a majority of them, to reverse the decision of the Commissioner, either in whole or in part, and, their opinion being certified to the Commissioner, he shall be governed thereby in the further proceedings to be had on

such application: *Provided, however,* That before a board shall be instituted in any such case, the applicant shall pay to the credit of the Treasury, as provided in the ninth section of this act, the sum of twenty-five dollars, and each of said persons so appointed shall be entitled to receive for his services in each case a sum not exceeding ten dollars, to be determined and paid by the Commissioner out of any moneys in his hands, which shall be in full compensation to the persons who may be so appointed for their examination and certificate as aforesaid."

Under this act the present system of examination was instituted. The machinery which it constituted in case of an appeal being desired from the primary examiner remained in force until March 2, 1861, when Congress passed an act creating a tribunal consisting of three persons, to be known as examiners-in-chief. Previous to the establishment of this board it had been the practice of the office to detail three examiners to perform the work at present devolving upon the board of examiners-in-chief. But sometimes persons not connected with the office were called upon to act as judges in an appeal case. As a new board was organized for each case, there was often a want of harmony among its members regarding rules of procedure and lack of legal training evident in the decisions reached. When the patent business began to increase rapidly, this system failed to meet the demands of the office, in consequence of the great amount of litigation which arose. Hence the present Board of Appeal was constituted, whose duty it is to hear and determine all questions on appeal from the decisions of the primary examiners.

The statute of 1836 embodied most of the methods for disposing of interfering applications that are now in force. It also provided for an arrangement and classification of models in the office, so that they should be easy of access for study and inspection. This statute also laid the foundation for the creation of the present valuable scientific library of the office, and \$1,500 was appropriated for it. Up to the time of the fire, in 1836, \$1,000 had been spent upon a few unimportant books, which were all destroyed except a single volume of *Repertory of Arts*. This is now preserved in the United States Patent Office Library as the only existing relic of the conflagration of Dec. 15, 1836.

The statute of 1836 retained the discrimination in favor of American patentees, but it was so modified as to require a residence of only one year, and provided that a subject of Great Britain should pay \$500 upon making his application, and for all other foreign applicants the fee was \$300. This discrimination was kept up in favor of American inventors until the act of March 2, 1861, abolished it. This law provided that there should be no discrimination against aliens unless the country to which they owed allegiance discriminated against citizens of the United States.

The law of 1836 created what is known as the caveat system, by which an inventor could, by paying \$20, file in the Patent Office a caveat setting forth the design and purpose of his invention, its principal and distinguishing character-

istics, and praying for protection of his right until he could mature his invention. This paper was to be filed in the confidential archives of the office, and when the patent was taken out, the sum of \$20 deposited as a fee for filing the caveat was to be applied upon the regular fees for issuing the patent.

This section also provided that if within one year from the time of filing the caveat any interfering application should be filed, it was the duty of the Commissioner to deposit his specification, drawings and model in the confidential archives of the office, and to give notice to the person filing the caveat of such interfering application, who must within three months mature his patent and file his description, specification, drawings and models, or lose the benefit of the security which the filing of his caveat gave him. This act continued in force exactly as it was passed until March 2, 1861, when the fee was reduced to \$10, as at present; and the refunding of any part of the sum or placing it to the credit of the inventor, when application was finally made for a patent, was forbidden.

The tribunal which was created by Congress for the purpose of hearing and determining applications for extension of patents continued to exercise that power until May 27, 1848, when Congress passed an act which transferred that duty to the Commissioner of Patents alone. The Commissioner had sole authority for the extension of patents until March 2, 1861, when Congress passed an act extending the patent term to 17 years, and providing that a patent thereafter granted should not be extended. Extensions were, however, made after the passage of this law, of patents granted prior to 1861, but upon patents granted after that date it required a special act of Congress in each case for the commissioner to grant an extension. And it still requires special legislation to secure an extension.

THE NEW ORGANIZATION. Soon after the passage of the law of 1836 the Patent Office was reorganized, and Henry L. Ellsworth of Connecticut was appointed Commissioner of Patents, J. W. Hand chief clerk, Chas. M. Keller examiner of patents, and Henry Stone draftsman.

By act of Congress of July 4, 1836, the sum of \$108,000 was appropriated to build the present Patent Office. The foundations were laid in the fall, but while work was progressing the nation suffered an irreparable loss. On the morning of Dec. 15, 1836, the postoffice building was discovered to be on fire, and, although many of the archives of the general postoffice department were saved, not a thing was preserved in the Patent Office, save one volume from the library, of little value to any one.

The Committee on Postoffices and Post Roads submitted, Jan. 20, 1837, a report on the destruction of the postoffice, in which they said that the evidence taken was conclusive that the fire originated in the cellar under the city postoffice, but in which room they were unable to say with certainty.

On Dec. 19, 1836, on motion of Senator Rugles of Maine, a committee of five was appointed to examine and report the extent of the loss sustained by the burning of the Patent Office, and to consider what measures ought to be adopted to repair the loss and to establish such evidences of property in patented inventions as the destruction of the models and drawings may have rendered necessary for its security. On Jan. 9, 1837, the committee made an extended report, in which they say: "The Patent Office contained the largest collection of models in the world. It was an object of just pride to every American able to appreciate its value as an item in the estimate of national character, or the advantages and benefits derivable from high improvement in the useful arts—a pride which must now stand rebuked by the improvidence which exposed so many memorials and evidences of the superiority of American genius to the destruction which has overtaken them. The number of models was about seven thousand. Many of them displayed great talent, ingenuity and mechanical science."

In addition to this report, this committee presented a bill in conformity with their views. This bill became a law on March 3, 1837. It gave any person in possession of a patent issued prior to Dec. 15, 1836, the right to record the same anew in the Patent Office, without charge, together with the descriptions, specifications and drawings belonging to the same. This law also imposed upon the Commissioner of Patents the duty of obtaining, as far as practicable, copies of patents, specifications, drawings, etc., for the purpose of having them transcribed and recorded. It also gave the Commissioner authority to record any authenticated copy of the original record, specification or drawing which he could obtain, and he was also permitted under this act to record any drawing produced as a delineation of the invention, if it was reinforced by an oath and referred to in the specification, even if it was not originally annexed to the patent.

Meanwhile, work progressed on the new Patent Office, which was completed for occupancy in 1852. An appropriation of \$50,000 in March, 1849, transferred in the same act the Patent Office from the Department of State to the then newly created Department of the Interior.

The Patent Office was doomed to another and irreparable loss in its new quarters. There was a popular faith that whatever might be the security offered to the records of the government elsewhere, the important and valuable archives of the Department of the Interior were sheltered in a building nearly, if not wholly, fire-proof. Here were the records of the Land Office, Bureau of Indian Affairs and others of the many distinct bureaus connected with this department. Here, too, were the records, original drawings and models of the Patent Office, forming a collection of inestimable value and world-wide fame.

Shortly after eleven o'clock on the 24th of September, 1877, columns of smoke were seen issuing from its roof, and a shower of flying cin-

ders gave evidence that a serious fire had begun its work. So great was the faith of the officers, clerks and other employees of the department, however, in the security of the building against fire, that for some time the alarm did not create very great apprehension as to the safety of the building or its valuable contents.

Aid came from near-by towns, but when the fire was extinguished it was found that the Patent Office was almost the only sufferer, aside from the damage to the building. The roof and the model-rooms and contents on the west and north sides were completely destroyed. In these two halls were 87,000 models. Among them were several thousand known as "pending" and "issue" cases. The former were those cases in which the applications were still pending in the examiners' rooms, and the latter belonged to that class of cases allowed by the examiners and still awaiting the payment of the final fees. The loss of these fell on the inventors. The loss of rejected models was not serious. These models, in all cases where they were required, had been returned to the parties furnishing them. Some, which were of use as illustrating mechanics or applied science, had been, from time to time, loaned to schools and seminaries, to be returned if called for. Most of those in the Ninth-Street loft, about twelve thousand in number, were practically valueless, and were kept only because of the possible injustice that might result if they were disposed of without notice to the applicants.

The loss by fire and water of photo-lithographic copies of drawings, it is estimated, amounted to 40,000 sets of 150 copies each, or about 600,000 copies in all. The drawings were copies only, and they could be replaced at an estimated expense of \$60,000. Thirty patented drawings in the class of wood-working machinery, which were in the hands of tracers in the model-rooms, were lost, as were also the models. Three original patented drawings of different classes of inventions which were being traced in the model-room to fill orders from attorneys, were destroyed. Two of these, having been traced some three months back for photo-lithographic reproduction, were at once restored by being mounted upon card-board. There were also some ten drawings, specifications and models destroyed of incomplete applications, they being in the hands of model draftsmen in the west hall of the model-room who were engaged in making drawings therefrom to fill orders. Eleven volumes of English patented drawings were missing. Nine of them were known to be in the model-room and were undoubtedly destroyed. Other minor losses occurred.

THE PRESENT PATENT LAWS. The statutes were amended in 1861, and finally, in 1870, the provisions then in force were consolidated into a single code, which four years later became part of the Revised Statutes of the United States. The essence of the American system and its best feature is the examination before allowance by an examiner of patents. This examination relates

to both the novelty and utility of the alleged invention. The latter question is easily disposed of, since, under the rulings of the office and the courts, every invention is considered "useful" if not actually found pernicious or dangerous. It sometimes occurs that a mechanical device is pronounced inoperative and a patent refused, but in such a case the applicant is allowed to file affidavits to the contrary. In fact, if the applicant's faith in the utility of his invention is strong enough to lead him to pay the office-fees, he is thought to be the best judge of this question.

The question of novelty is hard to decide. This is determined by a reference to American and foreign patents, printed scientific works in all languages, and all the information the examiner is able to collect from all sources relating to the art upon which he is especially employed.

The drawings of American patents are arranged by classes for the readiest reference. The English drawings are in bound volumes, with copious indexes and digests. These are kept in the library. In many examiners' rooms are manuscript digests, prepared with great labor, and setting forth the subject-matter of all patents belonging to the particular class under that examiner's special supervision. The library is filled with works on mechanics, and some that relate to every branch of industry.

With all these facilities, which are very imperfectly set forth here, the work of the examiner is intricate and delicate. It is an occurrence most rare for a device to be presented which is in all its features fully anticipated, either in some former patent or printed publication. The question usually turns upon distinctive claims for special features in the device, wherein it is alleged to differ from others of the same kind, and the solution of this question involves the nicest discrimination, both as to mechanical construction and interpretation of language and of law.

After a rejection of his claims, or any part of them, the applicant may amend them, and the new claims are again examined. A second rejection upon the same reference is "final," whereupon the applicant may, if he desires, take an appeal to the Board of Examiners-in-Chief. Should the board sustain the examiner in his decision, an appeal lies to the Commissioner in person. Should the examiner be reversed, the case is remanded to him for issue.

After rejection by the examiner, the applicant may amend at any time within two years; but if no action is made in that time, the application is considered abandoned.

All applications are examined in the order of their receipt by the examiner. The only exceptions to this rule are reissues, extensions and original applications in which the invention is deemed of special value to the government, and a request for its speedy examination is made by the head of an executive department.

Close study, thorough knowledge of the art, keen discernment and the highest intellectual

training are demanded of the examiner. The value of his work, in avoiding needless and expensive litigation, is inestimable.

The examination of an application prior to a grant of a patent, and the restriction of a patent to what is new therein, is, as has been said, the essence of the American patent system. The same plan has been adopted in a modified form by the government of the Dominion of Canada, and was favorably considered by the World's Patent Congress at Vienna in 1873, and by official representatives of the British and French governments, although it has not yet been adopted in those countries.

Several of the South American republics have patent systems copied mainly from that of the United States, but all these are yet in their infancy.

Of course there are objections that could be urged against the American system, but a careful review of the different systems in operation in the Old World, however, demonstrates the fact that the American practice produces more favorable results than any other, and is generally more satisfactory to all concerned, besides being more economical.

The American system requires a model, drawing and specification with each application, and a fee of \$15. This fee pays for the examination, and in return for it the applicant is informed, from the best official data, as to whether his alleged invention is new in whole or in part. If it possesses novelty, he can obtain a patent by the payment of an additional \$20, making \$35 in all, as the fee for a patent for 17 years. (When a case is appealed from adverse decision of the examiner there are small additional fees.) The patent is published as soon as granted, and a certified copy of the specification and a photolithograph of the drawing sent to every United States court, where it is open to public inspection. Other copies are kept for sale by the Patent Office, and a digest of the case, containing the claims and vital part of the drawing, is published in the weekly *Official Gazette*, which is sent free to eight libraries in each Congressional district, and is sent to subscribers at \$5 per annum.

A brief résumé of the rules of the patent office is as follows:

Applicants. A patent may be obtained by any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale in the United States for more than two years prior to his application, unless the same is proved to have been abandoned.

A patent may also be obtained by any person who, by his own industry, genius, efforts and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo or bas-relief; any new and original design for the printing of woolen, silk, cotton or other fabrics; any new and original impression, ornament, pattern, print or picture to be printed, painted, cast or otherwise placed on or worked into any article of manufacture; or any new, useful and original shape or

configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, nor patented nor described in any printed publication, upon payment of the fees required by law and other due proceedings had.

If it appear that the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused on account of the invention or discovery, or any part thereof, having been known or used in any foreign country before his invention or discovery thereof, if it had not been before patented or described in any printed publication.

Joint inventors are entitled to a joint patent; neither of them can obtain a patent for an invention jointly invented by them. Independent inventors of distinct and independent improvements in the same machine cannot obtain a joint patent for their separate inventions. The fact that one person furnishes the capital and another makes the invention does not entitle them to make an application as joint inventors; but in such case they may become joint patentees.

The receipt of letters-patent from a foreign government will not prevent the inventor from obtaining a patent in the United States unless the invention shall have been introduced into public use in the United States more than two years prior to the filing of the application. But every patent granted for an invention which has been previously patented by the same inventor in a foreign country will be so limited as to expire at the same time with the foreign patent, or, if there be more than one, at the same time with the one having the shortest unexpired term; but in no case will it be in force more than seventeen years.

The Application. Applications for letters-patent of the United States must be made to the Commissioner of Patents, and must be signed by the inventor, if alive. A complete application comprises the first fee of \$15, a petition, specification and oath; and drawings, model or specimen when required. The petition, specification and oath must be in the English language.

The application must be completed and prepared for examination within two years after the filing of the petition; and in default thereof, or upon failure of the applicant to prosecute the same within two years after any action thereon, of which notice shall have been duly mailed to him or his agent, the application will be regarded as abandoned, unless it shall be shown to the satisfaction of the Commissioner that such delay was unavoidable.

The Petition. The petition must be addressed to the Commissioner of Patents, and must state the name and residence of the petitioner requesting the grant of a patent, designate by title the invention sought to be patented, contain a reference to the specification for a full disclosure of such invention, and must be signed by the applicant.

The Specification. The specification is a written description of the invention or discovery, and of the manner and process of making, constructing, compounding and using the same, and is required to be in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which the invention or discovery appertains, or with which it is most nearly connected, to make, construct, compound and use the same.

The specification must set forth the precise invention for which a patent is solicited and explain the principle thereof, and the best mode in which the applicant has contemplated applying that principle, in such manner as to distinguish it from other inventions.

In case of a mere improvement, the specification must particularly point out the parts to which the improvement relates, and must by explicit language distinguish between what is old and what is claimed as new; and the description and the drawings, as well as the claims, should be confined to the specific improvement and such parts as necessarily co-operate with it.

The specification must conclude with a specific and distinct claim or claims of the part, improvement or combination which the applicant regards as his invention or discovery.

When there are drawings, the description will refer to

the different views by figures and to the different parts by letters or numerals (preferably the latter).

The following order of arrangement should be observed in framing the specification: 1. Preamble stating the name and residence of the applicant, the title of the invention, and, if the invention, has been patented in any country, the country or countries in which it has been so patented, and the date and number of each patent. 2. General statement of the object and nature of the invention. 3. Brief description of the several views of the drawings (if the invention admits of such illustration). 4. Detailed description. 5. Claim or claims. 6. Signature of inventor. 7. Signatures of two witnesses.

The specification must be signed by the inventor or by his executor or administrator, and the signature must be attested by two witnesses. Full names must be given, and all names, whether of applicants or of witnesses, must be legibly written.

Two or more independent inventions cannot be claimed in one application; but where several distinct inventions are dependent upon each other and mutually contribute to produce a single result they may be claimed in one application.

If several inventions, claimed in a single application, be of such a nature that a single patent may not be issued to cover them, the inventor will be required to limit the description, drawing and claim of the pending application to whichever invention he may elect. The other inventions may be made the subjects of separate applications, which must conform to the rules applicable to original applications. If the independence of the inventions be clear, such limitation will be made before any action upon the merits; otherwise it may be made at any time before final action thereon, in the discretion of the examiner.

The specification and claims must be plainly written or printed on but one side of the paper. All interlineations and erasures must be clearly referred to in marginal or foot notes on the same sheet of paper. Legal-cap paper with the lines numbered is deemed preferable, and a wide margin must always be reserved upon the left-hand side of the page.

The Oath. The applicant, if the inventor, must make oath or affirmation that he does verily believe himself to be the original and first inventor or discoverer of the art, machine, manufacture, composition or improvement for which he solicits a patent; that he does not know and does not believe that the same was ever before known or used; and shall state of what country he is a citizen and where he resides. In every original application the applicant must distinctly state, under oath, whether the invention has or has not been patented to himself, or to others with his knowledge or consent, in any country, and, if it has been, the country or countries in which it has been so patented, giving the date and number of each patent; and should also state that it has not been patented, in any other country or countries than those mentioned, and that, according to his knowledge and belief, the invention has not been in public use or on sale in the United States for more than two years prior to the application in this country.

If such application shall be found to be patentable, on the payment of the final fee, or at some time before patent shall issue, applicant shall file a statement setting forth, by date and number, so far as known, any patents for the same invention, granted to him or to others with his knowledge or consent, between the date of the execution of the application and the date of such payment.

The oath or affirmation may be made before any person within the United States authorized by law to administer oaths, or, when the applicant resides in a foreign country, before any minister, chargé d'affaires, consul or commercial agent holding commission under the government of the United States, or before any notary public of the foreign country in which the applicant may be, the oath being attested in all cases, in this and other countries, by the proper official seal of the officer before whom the oath or affirmation is made.

The Drawings. The applicant for a patent is required by law to furnish a drawing of his invention whenever the nature of the case admits of it.

The drawing may be signed by the inventor, or the name of the inventor may be signed on the drawing by his attorney in fact, and must be attested by two witnesses. The drawing must show every feature of the invention covered by the claims.

The following rules are rigidly enforced:

Drawings must be made upon pure white paper of a thickness corresponding to three-sheet Bristol-board. The surface of the paper must be calendered and smooth. India ink alone must be used, to secure perfectly black and solid lines.

The size of a sheet on which a drawing is made must be exactly 10 by 15 inches. One inch from its edges a single marginal line is to be drawn, leaving the "sight" precisely 8 by 13 inches. Within this margin all work and signatures must be included.

All drawings must be made with the pen only. Every line and letter (signatures included) must be absolutely black.

Drawings should be made with the fewest lines possible consistent with clearness. By the observance of this rule the effectiveness of the work after reduction will be much increased. Shading (except on sectional views) should be used only on convex and concave surfaces, where it should be used sparingly, and may even there be dispensed with if the drawing is otherwise well executed.

The Model. Preliminary examinations will not be made for the purpose of determining whether models are required in particular cases. Applications complete in all other respects will be sent to the examining divisions, whether models are or are not furnished. A model will only be required or admitted as a part of the application when on examination of the case in its regular order the primary examiner shall find it to be necessary or useful. In such case, if a model has not been furnished, the examiner shall notify the applicant of such requirement, which will constitute an official action in the case.

The model must clearly exhibit every feature of the machine which forms the subject of a claim of invention, but should not include other matter than that covered by the actual invention or improvement, unless it be necessary to the exhibition of the invention in a working-model.

The model must be neatly and substantially made, of durable material, metal being deemed preferable; but when the material forms an essential feature of the invention, the model should be constructed of that material. The model must not be more than one foot in length, width or height, except in cases in which the Commissioner shall admit working-models of complicated machines of larger dimensions. If made of wood it must be painted or varnished. Glue must not be used; but the parts should be so connected as to resist the action of heat or moisture. When practicable, to prevent loss, the model or specimen should have the name of the inventor permanently fixed thereon. In cases where models are not made strong and substantial, as here directed, the application will not be examined until a proper model is furnished.

A working-model is often desirable, in order to enable the office fully and readily to understand the precise operation of the machine.

Specimens. When the invention or discovery is a composition of matter, the applicant, if required by the Commissioner, shall furnish specimens of the composition, and of its ingredients, sufficient in quantity for the purpose of experiment.

The Examination. Applications filed in the Patent Office are classified according to the various arts, and are taken up for examination in regular order of filing, those in the same class of invention being examined and disposed of, as far as practicable, in the order in which the respective applications are completed.

The first step in the examination of an application will be to determine whether it is, in all respects, in proper form. If, however, the objections as to form are not vital, the examiner shall proceed to the consideration of the application on its merits; and in such case he must, if possible, in his first letter to the applicant, state all his objections, whether formal or otherwise; and until the

formal objections are disposed of, further action will not be taken upon the merits without the order of the Commissioner.

Rejections and References. Whenever, on examination, any claim of an application is rejected for any reason whatever, the applicant will be notified thereof. The reason for such rejection will be fully and precisely stated, and such information and references will be given as may be useful in aiding the applicant to judge of the propriety of prosecuting his application or of altering his specification; and if, after receiving such notice, he shall persist in his claim, with or without altering his specification, the application will be re-examined. If upon re-examination the claim shall be again rejected, the reasons therefor will be fully and precisely stated.

Upon the rejection of an application for want of novelty, the examiner must cite the best references at his command.

Amendments and Actions by Applicants. The applicant has a right to amend before or after the first rejection or action; and he may amend as often as the examiner presents new references or reasons for rejection.

Designs. A patent for a design may be granted to any person in the cases specified upon payment of the fee required by law and other due proceedings had, as in cases of inventions or discoveries.

Patents for designs are granted for the term of three and one half years, or for seven years, or for fourteen years, as the applicant may, in his application, elect.

The proceedings in applications for patents for designs are substantially the same as in applications for other patents. The specification must distinctly point out the characteristic features of the design, and carefully distinguish between what is old and what is believed to be new. The following order of arrangement should be observed in framing the specification: 1. Preamble, stating name and residence of the applicant, title of the design, and the name of the article for which the design has been invented. 2. Detailed description of the design, as it appears in the drawing, letters or figures of reference being used. 3. Claim or claims. 4. Signature of inventor. 5. Signatures of two witnesses.

When the design can be sufficiently represented by drawings, a model will not be required.

Reissues. A reissue is granted to the original patentee, his legal representatives, or the assignees of the entire interest, when the original patent is inoperative or invalid by reason of a defective or insufficient specification, or by reason of the patentee claiming, as his invention or discovery, more than he had a right to claim as new, provided the error has arisen through inadvertence, accident or mistake, and without any fraudulent or deceptive intention.

Interferences. An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties claiming substantially the same patentable invention. The fact that one of the parties has already obtained a patent will not prevent an interference, for, although the Commissioner has no power to cancel a patent, he may grant another patent for the same invention to a person who proves to be the prior inventor.

Appeals. Every applicant for a patent, any of the claims of whose application have been twice rejected for the same reasons, upon grounds involving the merits of the invention, such as lack of invention, novelty or utility, or on the ground of abandonment, public use or sale, inoperativeness of invention, aggregation of elements, incomplete combination of elements, or, when amended, for want of identity with the invention originally disclosed, or because the amendment involves a departure from the invention originally presented; and every applicant for the reissue of a patent whose claims have been twice rejected for any of the reasons above enumerated, or on the ground that the original patent is not "inoperative or invalid," or if so inoperative or invalid that the errors which rendered it so did not arise from "inadvertence, accident or mistake," may, upon payment of a fee of \$10, appeal from the decision of the primary examiner to the examiners-in-chief. The appeal must set forth in writing the points of the decision upon which it is taken,

and must be signed by the applicant or his duly authorized attorney or agent.

There must have been two rejections of the claims as originally filed, or, if amended in matter of substance, of the amended claims; and all the claims must have been passed upon, and all preliminary and intermediate questions relating to matters not affecting the merits of the invention settled, before the case can be appealed to the examiners-in-chief.

Issue. If, on examination, it shall appear that the applicant is justly entitled to a patent under the law, a notice of allowance will be sent him or his attorney, calling for the payment of the final fee within six months from the date of such notice of allowance, upon the receipt of which within the time fixed by law the patent will be prepared for issue.

After notice of the allowance of an application is given, the case will not be withdrawn from issue except by approval of the Commissioner, and if withdrawn for further action on the part of the office, a new notice of allowance will be given. When the final fee has been paid upon an application for letters-patent and the case has received its date and number, it will not be withdrawn or suspended from issue on account of any mistake or change of purpose of the applicant or his attorney, nor for the purpose of enabling the inventor to procure a foreign patent, nor for any other reasons except mistake on the part of the office, or because of fraud or illegality in the application, or for interference.

Date, Duration and Form of Patents. Every patent will bear date as of a day not later than six months from the time the application was passed and allowed and notice thereof was mailed to the applicant or his attorney, if within that period the final fee be paid to the Commissioner of Patents, or if it be paid to the Treasurer or any of the assistant treasurers or designated depositories of the United States, and the certificate promptly forwarded to the Commissioner of Patents; and if the final fee be not paid within that period, the patent will be withheld.

A patent will not be antedated.

Every patent will contain a short title of the invention or discovery, indicating its nature and object, and a grant to the patentee, his heirs and assigns, for the term of seventeen years, of the exclusive right to make, use and vend the invention or discovery throughout the United States and the territories thereof. But if the invention has been previously patented abroad, the term of the patent will expire with the term of the foreign patent. The duration of a design patent may be for the term of three and a half, seven or fourteen years. A copy of the specifications and drawings will be annexed to the patent and form part thereof.

Delivery. The patent will be delivered or mailed on the day of its date to the patentee, unless there be an attorney of record, in which case it will be delivered to him or the patentee, as the attorney may request; but it will not, without a special request from the applicant, be delivered to an associate or substitute attorney.

Correction of Errors in Letters-Patent. Whenever a mistake, incurred through the fault of the office, is clearly disclosed by the records or files of the office, a certificate, stating the fact and nature of such mistake, signed by the Secretary of the Interior, countersigned by the Commissioner of Patents and sealed with the seal of the Patent Office, will, at the request of the patentee or his assignee, be indorsed without charge upon the letters-patent and recorded in the records of patents, and a printed copy thereof attached to each printed copy of the specification and drawing.

Whenever a mistake, incurred through the fault of the office, constitutes a sufficient legal ground for a reissue, such reissue will be made, for the correction of such mistake only, without charge of office fees, at the request of the patentee.

Mistakes not incurred through the fault of the office, and not affording legal grounds for reissues, will not be corrected after the delivery of the letters-patent to the patentee or his agent. Changes or corrections will not be made in letters-patent after the delivery thereof to the patentee or his attorney, except as above provided.

Abandoned, Forfeited, Revived, and Renewed Applications.

An abandoned application is one which has not been completed and prepared for examination within two years after the filing of the petition, or which the applicant has failed to prosecute within two years after any action therein, of which notice has been duly given or which the applicant has expressly abandoned by filing in the office a written declaration of abandonment, signed, by himself (and assignee if any), identifying his application by title of invention, serial number and date of filing.

Prosecution of an application to save it from abandonment must include such proper action as the condition of the case may require. The admission of an amendment not responsive to the last official action, or refusal to admit the same, and any proceedings relative thereto, shall not operate to save the application from abandonment under section 4894 of the Revised Statutes.

Before an application abandoned by failure to complete or prosecute can be revived as a pending application, it must be shown to the satisfaction of the Commissioner that the delay in the prosecution of the same was unavoidable.

When a new application is filed in place of an abandoned or rejected application, a new specification, oath, drawing and fee will be required; but the old model, if suitable, may be used.

A forfeited application is one upon which a patent has been withheld for failure to pay the final fee within the prescribed time.

Extensions. Patents cannot be extended except by act of Congress. An examination invariably precedes such action by Congress.

Disclaimers. Whenever, through inadvertence, accident or mistake, and without any fraudulent or deceptive intention, a patentee has claimed as his invention or discovery more than he had a right to claim as new, his patent shall be valid for all that part which is truly and justly his own, provided the same is a material or substantial part of the thing patented; and any such patentee, his heirs or assigns, whether of the whole or any sectional interest therein, may, on payment of the fee required by law (ten dollars), make disclaimer of such parts of the thing patented as he or they shall not choose to claim or to hold by virtue of the patent or assignment, stating therein the extent of his interest in such patent. Such disclaimer shall be in writing, attested by one or more witnesses, and recorded in the Patent Office; and it shall thereafter be considered as part of the original specification to the extent of the interest possessed by the claimant and by those claiming under him after the record thereof. But no such disclaimer shall affect any action pending at the time of filing the same, except as to the question of unreasonable neglect or delay in filing it.

Caveats. A caveat, under the patent law, is a notice given to the Patent Office of the caveator's claim as inventor, in order to prevent the grant of a patent to another person for the same alleged invention upon an application filed during the life of the caveat without notice to the caveator.

Any citizen of the United States who has made a new invention or discovery and desires further time to mature the same may, on payment of a fee of ten dollars, file in the Patent Office a caveat setting forth the object and the distinguishing characteristics of the invention, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof.

The caveat may be renewed, on request in writing, by the payment of a second caveat fee of ten dollars, and it will continue in force for one year from the date of the payment of such second fee. Subsequent renewals may be made with like effect. If a caveat be not renewed, it will still be preserved in the secret archives of the office.

An alien has the same privilege, if he has resided in the United States one year next preceding the filing of his caveat, and has made oath of his intention to become a citizen.

Assignments. Every patent or any interest therein shall be assignable in law by an instrument in writing, and the patentee or his assigns or legal representatives

may, in like manner, grant and convey an exclusive right under the patent to the whole or any specified part of the United States.

Office Fees. Nearly all the fees payable to the Patent Office are positively required by law to be paid in advance; that is, upon making application for any action by the office for which a fee is payable. For the sake of uniformity and convenience, the remaining fees will be required to be paid in the same manner.

The following is the schedule of fees and of prices of publications, etc., of the Patent Office:

On filing each original application for a design patent for three years and six months,.....	\$10.00
On filing each original application for a design patent for seven years.....	15.00
On filing each original application for a design patent for fourteen years.....	30.00
On allowance of an application for a design patent, no further charge.	
On filing each caveat.....	10.00
On filing each original application for a patent...	15.00
On allowance of an original application for a patent, except in design cases.....	20.00
On filing a disclaimer.....	10.00
On filing every application for the reissue of a patent.....	30.00
On filing each application for a division of a reissue	30.00
On allowance of an application for the reissue of a patent, no further charge.	
On filing every application for an extension of a patent.....	50.00
On the granting of every extension of a patent...	50.00
On filing an appeal for the first time from a primary examiner or the examiner of interferences to the examiners-in-chief.....	10.00
On filing every appeal from the examiners-in-chief to the Commissioner.....	20.00
For manuscript copies of records in the English language, for every one hundred words or fraction thereof.....	.10
If certified, for the certificate, additional.....	.25
For copies of drawings not in print, the reasonable cost of making them.	
For uncertified copies of the specifications and accompanying drawings of all patents which are printed, per copy.....	.10
For twenty coupon orders, each coupon good until used for one copy of a printed specification and drawing.....	2.00
For certified copies of printed patents:	
For specification and drawing, per copy.....	.10
For the certificate.....	.25
For the grant.....	.50
For the specification, if not in print, for every one hundred words or fraction thereof.....	.10
For the drawings if in print.....	.10
For the drawings, if not in print, the reasonable cost of making them.	
For certifying to a duplicate of a model.....	.50
For abstracts of title to patents or inventions:	
For the certificate of search.....	1.00
For each brief from the digest of assignments....	.20
For copies of matter in any foreign language, for every one hundred words or a fraction thereof,	.10
For translation, for every one hundred words or fraction thereof.....	.50
For recording every assignment, agreement, power of attorney, or other paper, of three hundred words or under.....	1.00
For recording every assignment, agreement, power of attorney, or other paper of over three hundred words and under one thousand words,	2.00
For recording every assignment, agreement, power of attorney, or other paper of over one thousand words.....	3.00
For assistance to attorneys and others in the examination of records, one hour or less.....	.50
Each additional hour or fraction thereof.....	.50
For assistance to attorneys in the examination of patents or other matter in the scientific library, one hour or less.....	1.00

For each additional hour or fraction thereof	1.00
For subscription to the <i>Official Gazette</i> , published every Tuesday, all subscriptions to commence with the beginning of a volume, none being taken for a less period than three months, and there being no club rates or discount to news-dealers, as follows:	
To all subscribers within the United States and Canada, one year	5.00
To foreign subscribers, except in Canada	7.00
Single numbers	.10
For bound volumes of the <i>Official Gazette</i> :	
Semiannual volumes, from Jan. 1, 1872, to June 30, 1883, full sheep binding, per volume	4.00
Semiannual volumes, from Jan. 1, 1872, to June 30, 1883, half sheep binding, per volume	3.50
Quarterly volumes subsequent to July 1, 1883, full sheep binding, per volume	2.75
For the annual index—lists of patentees and inventions, alphabetically arranged, with date of patent, number, etc., from January, 1872—one volume each year, full law binding, per volume	2.00
In paper covers, per volume	1.00
For the general index—a list of inventions patented from 1790 to 1873, with the name of inventor, residence, date of patent, number, etc.—three volumes full law binding, per set	10.00
For the index from 1790 to 1836—a list of inventions patented from 1790 to 1836, photolithographed from Patent-Office Reports—one volume, full law binding	5.00
For the monthly volumes, containing the specifications and photolithographed copies of the drawings of all patents issued during the month, certified, bound full sheep, per volume	12.00
For the monthly volumes, containing the specifications and photolithographed copies of the drawings of all patents issued during the month, certified, bound half sheep, per volume	10.00
For the index to patents relating to electricity, granted by the United States prior to June 30 1882, one volume, 250 pages, bound	5.00
In paper covers	3.00
Annual appendixes for each fiscal year subsequent to June 30, 1882, paper covers	1.50
For Commissioners' Decisions:	
For 1869-71, bound in one volume, full law binding	2.00
For 1872-74, bound in one volume, full law binding	2.00
For 1875-76, bound in one volume, with decisions of United States courts in patent cases, full law binding	2.00
For 1875-76, bound in paper covers	1.00
For 1877-83, one volume each year, with decisions of the United States courts, full law binding, per volume	2.00
For 1877-83, bound in paper covers	1.00
Pamphlet of the Rules of Practice	Free.
Pamphlet of the patent laws	Free.
There are no annual reports for gratuitous distribution.	

Publications. The *Official Gazette*, a weekly publication which has been issued since 1872, takes the place of the old *Patent Office Report*. It contains the claims of all patents issued, including reissues, with portions of the drawings selected to illustrate the inventions claimed. It also contains decisions rendered by the courts in patent cases and by the Commissioner of Patents, and other special matters of interest to inventors.

The *Gazette* is furnished to subscribers at the rate of \$5 per annum. When sent abroad an additional charge of \$2 is made for the payment of postage. Representatives and senators are each entitled to a copy, and each is entitled to designate eight public libraries to which the *Gazette* will be sent without charge. Single copies are furnished for ten cents each.

An index is published annually, which is sent to all subscribers and designated libraries without additional cost.

Printed volumes are issued monthly, containing the entire specifications and drawings of all patents issued

during the previous month. These are authenticated by the seal of the office, and may be used as evidence throughout the United States. One copy is deposited in the Library of Congress and in each state and territorial library, and one copy in the custody of the clerk of each United States district court, for general reference.

RULES AND FORMS ADOPTED FOR THE REGISTRATION OF TRADE-MARKS UNDER THE ACT OF 1881.

Who May Obtain Registration. Any person, firm or corporation domiciled in the United States or located in any foreign country which, by treaty, convention, or law affords similar privileges to citizens of the United States,* and who is entitled to the exclusive use of any trade-mark and uses the same in commerce with foreign nations or with Indian tribes.

Any citizen or resident of this country wishing the protection of his trade-mark in any foreign country the laws of which require registration in the United States as a condition precedent.

Statutory Requirements. Every applicant for registration of a trade-mark must cause to be recorded in the Patent-Office—

The name, domicile and place of business or location of the firm or corporation desiring the protection of the trade-mark, and the residence and citizenship of individual applicants.

The class of merchandise and the particular description of goods comprised in such class to which the trade-mark has been appropriated.

A description of the trade-mark itself, with fac-similes thereof, and the mode in which it has been applied and used.

The length of time during which the trade-mark has been used by the applicant on the class of goods described.

A fee of \$25 is required on filing each application, except in the cases hereinafter named.

The Application. An application for the registration of a trade-mark will consist of a statement or specification, a declaration or oath, and the fac-simile with duplicates thereof. The statement and declaration should be written on one side of the paper only.

These should be preceded by a brief letter of advice requesting registration and signed by the applicant.

The statement should announce the full name, citizenship, domicile, residence and place of business of the applicant (or, if the applicant be a corporation, under the laws of what state or nation incorporated), with a full and clear specification of the trade-mark, particularly discriminating between its essential and non-essential features. It should also state from what time the trade-mark has been used by the applicant, the class of merchandise and the particular goods comprised in such class.

*The following is a list of the governments with which conventions for the reciprocal registration and protection of trade-marks have been entered into by the United States, with the dates of the respective conventions. The laws of Switzerland and the Netherlands being so framed as to afford reciprocal privileges to the citizens or subjects of any government which affords similar privileges to the people of those countries, the mere exchange of diplomatic notes, giving notice of the fact, accomplishes all the purposes of a formal convention.

Austria-Hungary	June 1, 1872
Belgium	July 30, 1869
Belgium	July 9, 1884
Brazil	Sept. 24, 1878
France	Apr. 16, 1869
German Empire	June 1, 1872
Great Britain	July 17, 1878
Italy	Mar. 19, 1884
Russia	June 27, 1868
Servia	Dec. 27, 1882
Spain	Apr. 19, 1883
Switzerland	May 16, 1883
The Netherlands	Feb. 16, 1883

The declaration with Great Britain is drawn so as to confer mutual trade-mark rights upon the subjects and citizens of each of the contracting parties throughout the dominions and possessions of the other. Citizens or residents of British colonies are therefore permitted to register their trade-marks under this treaty whenever it is satisfactorily shown that in the respective colonies similar protection is afforded to citizens of the United States.

The following governments are members of the International Union for the Protection of Industrial Property, created by the convention at Paris, of March, 1883, to which the United States acceded in 1887: Belgium, Brazil, the Dominican Republic, France, Great Britain, Guatemala, Italy, The Netherlands, Norway, Portugal, San Salvador, Servia, Spain, Sweden, Switzerland, Tunis.

The people of the French and Spanish colonies, Dutch East India colonies, and the British colonies of New Zealand and Queensland are entitled to the benefit of this convention.

to which the trade-mark is appropriated, and the manner in which the trade-mark has been applied to the goods.

The declaration should be in the form of an oath by the person or by a member of the firm or by an officer of the corporation making the application, to the effect that the party has at the time of filing his application a right to the use of the trade-mark described in the statement; that no other person, firm or corporation has a right to such use, either in the identical form or in such near resemblance thereto as might be calculated to deceive; that such trade-mark is used in lawful commerce with foreign nations or Indian tribes, one or more of which should be particularly named; and that it is truly represented in the fac-simile presented for registry.

Fac-Similes to be Filed. An applicant for registration of a trade-mark must in every case, which admits of it, furnish a drawing thereof which conforms to the rules for drawings of mechanical patents. If for any reason such drawing does not constitute a satisfactory fac-simile of the trade-mark, two copies of the trade-mark, as actually used, must be deposited in addition to the required drawing, to be preserved in the office for reference.

Proceedings in the Office. All applications for registration are considered in the first instance by the trade-mark examiner. An adverse decision by such examiner upon the applicant's right to registration will be reviewed by the Commissioner in person upon petition without fee.

No trade-mark will be registered unless it shall be made to appear that the same is used as such by the applicant in commerce between the United States and some foreign nation or Indian tribe, or is within the provisions of a treaty, convention or declaration with a foreign power, nor which is merely the name of the applicant, nor which is identical with a known or registered trade-mark owned by another and appropriated to the same class of merchandise, or which so nearly resembles some other person's lawful trade-mark as to be likely to cause confusion in the mind of the public or to deceive purchasers, or which is merely descriptive in its nature.

The statement may be amended to correct informalities or to avoid objections made by the office, or for other reasons arising in the course of examination; but no amendments will be admitted unless warranted by something in the statement or fac-simile as originally filed. In respect to amendments the established rules in regard to applications for patents will be observed. The declaration cannot be amended. If that filed with the application is faulty or defective, a substitute declaration may be filed.

In case of conflicting applications for registration, or in any dispute as to the right to use which may arise between an applicant and a prior registrant, the office will declare an interference, in order that the parties may have an opportunity to prove priority of adoption or right; and the proceedings on such interference will follow, as nearly as practicable, the practice in interferences upon applications for patents; but each applicant and registrant will be held to the date of adoption alleged in the statement filed with his application. On the petition of any party dissatisfied with the decision of the examiner of interferences, the case will be reviewed by the Commissioner without fee.

When these requirements have been complied with, and the office has adjudged the trade-mark lawfully registrable, a certificate will be issued by the Commissioner, under seal of the Interior Department, to the effect that applicant has complied with the law, and that he is entitled to the protection of his trade-mark in such case made and provided. Attached to the certificate will be a fac-simile of the trade-mark and a printed copy of the statement and declaration.

The protection for such trade-mark will remain in force for thirty years, and may, upon the payment of a second fee, be renewed for thirty years longer, except in cases where such trade-mark is claimed for and applied to articles not manufactured in this country, and in which it receives protection under the laws of any foreign country for a shorter period, in which case it will cease to have force in this country, by virtue of the registration, at the same time that the trade-mark ceases to be exclusive property elsewhere.

The right to the use of any trade-mark is assignable by an instrument in writing, and provision is made for recording such instrument in the Patent Office. But no such instrument or conveyance will be recorded unless the trade-mark shall have first been registered as provided by law; and it must be identified by its certificate number. No particular form of instrument is prescribed.

The *Official Gazette* of the Patent Office will contain a list of all trade-marks registered, with the name and address of the registrant, an illustration of the trade-mark, a brief statement of its essential features, and the particular description of goods to which it is applied.

Fees:

On filing an application for registration of a trade-mark.....	\$25.00
For abstract of title:	
For the certificate of search.....	1.00
For each brief from the digests of assignments.....	.20
For copies of matter in any foreign language, for every 100 words or fraction thereof.....	.10
For translation, for every 100 words or fraction thereof.....	.50
For recording every assignment, agreement, power of attorney, or other paper, of 300 words or under.....	1.00
For recording every assignment, agreement, power of attorney, or other paper of over 300 words and under 1,000 words.....	2.00
For recording every assignment, agreement, power of attorney, or other paper of over 1,000 words.....	3.00
For assistance to attorneys and others in the examination of records, one hour or less.....	.50
Each additional hour or fraction thereof.....	.50
For single printed copy of statement and declaration.....	.10
If certified, for the certificate, additional.....	.25
Single copy of the <i>Official Gazette</i>	.10
Annual subscription <i>Official Gazette</i>	5.00

REGISTRATION OF PRINTS AND LABELS.

Sections 3, 4 and 5 of the act of Congress relating to patents, trade-marks and copyrights, approved June 18, 1874 (18 Statutes at Large, p. 78) provide as follows:

SEC. 3. That in the construction of this act the words "engraving, cut, and print" shall be applied only to pictorial illustrations or works connected with the fine arts, and no prints or labels designed to be used for any other articles of manufacture shall be entered under the copyright law, but may be registered in the Patent Office. And the Commissioner of Patents is hereby charged with the supervision and control of the entry or registry of such prints or labels, in conformity with the regulations provided by law as to copyright of prints, except that there shall be paid for recording the title of any print or label not a trade-mark \$6, which shall cover the expense of furnishing a copy of the record, under the seal of the Commissioner of Patents, to the party entering the same.

SEC. 4. That all laws and parts of laws inconsistent with the foregoing provisions be and the same are hereby repealed.

SEC. 5. That this act shall take effect on and after the first day of August, eighteen hundred and seventy-four.

The words "prints" and "labels" as used in this act so far as it relates to registration in the Patent Office are construed as synonymous, and are defined as any device, picture, word or words, figure or figures (not a trade-mark) impressed or stamped directly upon the articles of manufacture, or upon a slip or piece of paper, or other material, to be attached in any manner to manufactured articles, or to bottles, boxes and packages containing them, to indicate the contents of the package, the name of the manufacturer, or the place of manufacture, the quality of goods, directions for use, etc.

By the words "articles of manufacture" (to which such print or label is applicable by this act) is meant all vendible commodities produced by hand, machinery or art.

But no such print or label can be registered unless it properly belongs to an article of commerce, and be as above defined; nor can the same be registered as such print or label when it amounts to a lawful trade-mark, or when its use in connection with the article to which it is applied is arbitrary or fanciful.

To entitle the owner of any such print or label to register the same in the Patent Office, it is necessary that five copies of the same be filed, one of which copies shall be certified under the seal of the Commissioner of Patents, and returned to the registrant.

The certificate of such registration will continue in force for twenty-eight years.

It has been held in a United States circuit court that the use of a label in the sale of the merchandise it is intended to designate prior to the deposit of such label in the Patent Office amounts to a publication thereof (*Marsh et al. vs. Warren et al.*, XIV O. G., 678.) Since in the same decision the court held that in a suit for infringement of a registered label the bill must aver that the title and label were deposited before publication, it is evident that any such use will vitiate a registration subsequently effected.

The fee for registration of a print or label is \$6, to be paid in the same manner as fees for patents.

The benefits of this act seem to have been originally confined to citizens or residents of the United States, but are extended by existing treaties to British, German, Italian and Belgian subjects.

BIBLIOGRAPHY. The bibliography of the United States patent system is extensive. The patent laws, rules of procedure and annual reports of the Commissioner of Patent afford a valuable insight into the actual working of the system, while *The Official Gazette of the United States Patent Office* is the most authoritative chronicle of all applications received and patents granted. *An Account of the Destruction by Fire of the Patent Office* (1877) is full of valuable historical data, and L. H. Campbell's *The Patent System* is a valuable work from the pen of one of the examiners. Turning to the more legal text-books, mention may be made of O. F. Bump's *Law of Patents, Trade-Marks and Copyright* (1877); R. M. Clapp's *Law in Patents and Decisions of the Courts* (1885); C. E. Coddington's *Digest of Law of Trade-Marks* (1877); H. C. Merwin's *Patentability of Inventions* (1883); C. S. Whitman's *Patent Laws and Practice* (1879); H. T. Fenton's *Law of Patents for Designs* (1889); G. H. Knight's *Patent Office Manual* (1893); and W. C. Robinson's valuable and voluminous *Law of Patents for Useful Inventions* (3 vols., 1890). The legal text-books relative to the English law and practice of patents are mentioned in Sonnenschein's *Best Books*.

PATER, WALTER, an English critic in literature and art; was born in London, Aug. 4, 1839. He was educated at King's School, Canterbury, and at Queen's College, Oxford, taking a second-class in classics in 1862. Three years later he was elected a fellow of Brasenose College, and there, for a time, acted as dean and lecturer. He then traveled on the European continent. In Italy, especially, with a student's enthusiasm, he familiarized himself with the scenes and historic mementoes of the classical and mediæval eras of which he was afterward exquisitely to write. Pater began his literary career by contributing a paper on Coleridge's works to the *Westminster Review*, and in 1873 he published a series of essays on art and letters, entitled *Studies in the History of the Renaissance*. This was followed, in 1885, by *Marius the Epicurean, His Sensations and Ideas*, being the imaginary mental history of a youth educated in Roman paganism and perplexed with the problem of life. In 1887 appeared four artistic studies under the title of *Imaginary Portraits*, and in 1889 a volume of appreciative literary criticism, with an essay on style, entitled *Appreciations*. *Plato and Platonism* followed in 1893, and after his death appeared *Greek Studies* (1894), and *Gaston de Latour* (1896), an unfinished romance of much splendor of phrase and setting. Mr. Pater's death, July 30, 1894, at a comparatively early age, was a great loss, for he was a writer of subtle and searching insight, while his literary style has given new attractions to art, as well as a new delight to lovers of Greek ideals and the Greek spirit.

PATERNITY. See **MEDICAL JURISPRUDENCE**, Vol. XV, p. 779.

PATERNOSTER, a tackle. See **ANGLING**, Vol. II, p. 35.

PATERSON, the "Lyons of America," a city of considerable size and importance in New Jersey. It has exceptional railroad facilities by the New York, Lake Erie and Western, New York, Susquehanna and Western and the Delaware, Lackawanna and Western railways; is connected with the Delaware River by canal, and a proposal has been made to render the Passaic River navigable to Paterson. The returns of 1890 showed 73 industries in 597 establishments, with \$27,387,421 in capital, giving employment to 24,135 persons, paying \$11,523,558, and having annual products worth \$41,898,231. Of these industries, silk was easily the most important, having 90 establishments, furnishing employment to 11,596 persons, paying \$5,021,768 in wages, having a capital of \$14,353,491, and producing goods to the value of \$22,058,624. Of the many other important industries the most important are foundries and machine-shops, employing over 3,000 hands; dyeing and finishing works; iron and steels works; manufactures of jute and jute goods; malt liquor establishments; linen-thread plant; and numerous building trades.

The assessed valuation of city property in 1890, at about 30 per cent of the market value, was \$28,824,280; the municipal debt, \$1,605,993; and city taxes limited to 2½ per cent of total valuation. The city has good paved and macadamized streets, 35 miles of electric street-railways, electric lights, water-works, paid fire department, good school system embracing 17 well-equipped buildings, 200 teachers, 64 churches, 31 public halls, 2 parks, large public library, 2 large hospitals, 2 orphan asylums, old ladies' home, 3 national banks with combined capital of \$850,000, savings and private banks, 6 daily and 7 weekly newspapers and a monthly periodical. Population 1890, 78,347; 1895, 97,344. See also **PATERSON**, Vol. XVIII, p. 359.

PATHROS. See **EGYPT**, Vol. VII, p. 700.

PATKUL, JOHANN REGINALD (1660-1707). See **CHARLES XII**, Vol. V, p. 420.

PATMORE, COVENTRY KEARSEY DEIGHTON, a British poet; born in Woodford, England, July 23, 1823, the son of P. G. Patmore, author of *Literary Reminiscences*. He published a volume of *Poems* in 1844, and three years later joined the staff of librarians in the British Museum, where he remained till 1868. Soon after he settled at Hastings, where he built a large Catholic church. His second volume of poems, *Tamerton Church Tower*, etc., prepared the way for his greatest work, *The Angel in the House*, an exquisite and sincere poem of love from the domestic side, which has had a great popularity. Patmore edited the anthology entitled *The Children's Garland from the Best Poets*; the *Autobiography* of Barry Cornwall; the posthumous poems of his son, Henry Patmore; and *Florilegium Amantis*, a selection from his own poems (1888). Died Nov. 26, 1896.

PATON, JOHN GIBSON, a Scotch missionary; born in the parish of Kirkmahoe, May 24, 1824. After some experience in Glasgow City Mission, he offered

his services for the foreign mission-field in connection with the Reformed Presbyterian Church, and in 1858 became missionary in Tanna, New Hebrides. Here he labored, amidst trials and difficulties, till 1862, when he was forced to leave, owing to the hostility of the natives. In the interest of the New Hebrides mission he visited Australia in 1862-63, Great Britain in 1863-64, and the Australian colonies in 1865, when he became missionary on the neighboring island of Aniwa, the whole population of which becoming Christian. He again visited Great Britain and North America in 1892-94. He was a delegate to the Pan-Presbyterian Church in Belfast in 1884, and at Toronto in 1892. His autobiography, edited by his brother, was published in 1889.

PATON, SIR JOSEPH NOEL, a Scotch historical painter; born in Dunfermline, Dec. 13, 1821; and studied for a time at the Royal Academy, London. His cartoon sketch, *The Spirit of Religion*, gained one of the three premiums at the Westminster Hall competition in 1845. Two years thereafter, his oil picture of *Christ Bearing the Cross* and his *Reconciliation of Oberon and Titania* jointly gained the prize of \$1,500. *Dante Meditating the Episode of Francesca* was exhibited in Edinburgh in 1852; *The Dead Lady*, in 1854; and *The Pursuit of Pleasure*, in 1855. Among his other pictures are *Home from the Crimea*; *In Memoriam*, a scene from the Indian Mutiny; and a series of six pictures-illustrations of *Dowie Dens o' Yarrow*. He illustrated Aytoun's *Lays of the Scottish Cavaliers*, and in 1864 executed twenty illustrations of the *Ancient Mariner*. He published two volumes of poems.

PATRICK, MARSENA R., an American soldier; born in Houndsfield, New York, March 15, 1811; graduated at West Point in 1835; served in the Florida and Mexican wars; resigned, became a farmer and was president of the State Agricultural College. During the Civil War he was inspector-general of the New York militia, brigadier-general of volunteers; provost marshal-general of the army of the Potomac in 1862, later of the combined armies before Richmond, and after Lee's surrender of the Department of Virginia. After the war he was again president of the State Agricultural Society, and from 1880 till his death governor of the central branch of the National Home for Disabled Volunteer Soldiers in Ohio. He died in Dayton, Ohio, July 27, 1888.

PATRIOTIC SOCIETIES. See COLONIAL SOCIETIES and GENEALOGIES, in these Supplements.

PATRIPASSIANS. See JESUS, Vol. XIII, p. 671.

PATROCLUS. See ACHILLES, Vol. I, p. 95.

PATRONAGE. See ADVOWSON, Vol. I, p. 179.

PATRONS OF HUSBANDRY. See FARMERS' ORGANIZATIONS, in these Supplements.

PATROONS. See NEW YORK, Vol. XVII, p. 454.

PATTEE, FRED LEWIS, an American educationist and author; born in Bristol, New Hampshire, March 22, 1866; educated at New Hampton Institution and at Dartmouth College, from which latter institution he graduated in 1888. He was the poet of his class. After serving as principal of high schools in Eatontown, New Jersey, and in Mendon, Massachusetts, he was, in 1890, made principal of

Coe's Academy, Northwood, New Hampshire, where he served four years. After 1894 he was professor of English and rhetoric in the Pennsylvania State College. He published *Literature in the Public Schools* (1891); *The Wine of May, and Other Lyrics* (1893); *Pasquaney*, sketches of a New Hampshire lake (1894); *A History of American Literature, with a View to the Fundamental Principles Underlying Its Development* (1896). He contributed the articles AMERICAN LITERATURE and CANADIAN LITERATURE, in these Supplements.

PATTEN, SIMON NELSON, an American political economist; born at Sandwich, Illinois, May 1, 1852; educated at the Northwestern University, Evanston, Illinois; received the degree of Ph.D. from the University of Halle, Germany, in 1878; professor of political economy in the University of Pennsylvania in 1888. He contributed largely to various political science journals. Among his published works are *The Stability of Prices* (1888); *The Consumption of Wealth* (1889); *The Economic Basis of Protection* (1890); *The Educational Value of Political Economy* (1891); *The Theory of Dynamic Economics* (1892); *Cost and Expense* (1893); *Failure of Biologic Science* (1894); *Economics in Elementary Schools* (1895).

PATTERSON, DANIEL TODD, an American naval officer; born on Long Island, New York, March 6, 1786; midshipman in the United States navy in 1800; taken from the frigate *Philadelphia* by a flotilla of Tripolitan gunboats and kept a prisoner until 1805; promoted to lieutenant in 1807 and to that of master-commandant in 1813. He commanded the naval forces at New Orleans in 1814, and for his co-operation with General Jackson in defending the city, received the thanks of Congress. He was appointed captain in 1815; in command of the *Constitution* in the Mediterranean (1826-28); naval commissioner (1828-32); in command of the Mediterranean squadron (1832-36); commandant at the Washington navy-yard from 1836 till his death, which occurred Aug. 15, 1839.—His son, CARLILE POLLOCK, an American engineer; born in Shieldsboro, Mississippi, Aug. 24, 1816; midshipman in the United States navy in 1830, served in the Mediterranean squadron and returned home in 1836. He graduated at Georgetown College (Kentucky) as civil engineer in 1836; served in the United States Coast Survey until 1841; cruised in the West Indies until 1844; was again in the Coast Survey till 1845. He was placed in charge of a hydrographic party in the Gulf of Mexico; retired from the navy; from 1850 to 1861 in command of the Pacific mail steamer *Oregon*; from 1861 to 1874 hydrographic inspector of the United States Coast Survey; then superintendent of that work till his death, which occurred Aug. 15, 1881. He served for many years as a member of the Lighthouse Board, was a member of various societies, and in 1878 received the degree of LL.D. from Amherst. In addition to his reports of special duty, he edited the annual reports of the United States Coast and Geodetic Survey during his administration.

PATTERSON, ROBERT, an American soldier; born in County Tyrone, Ireland, Jan. 12, 1792; went to the United States with his parents when a boy;

educated in the common schools; became clerk in a counting-house in Philadelphia, and subsequently became a very successful merchant in that city. At the beginning of the Mexican War he was appointed major-general of volunteers and commanded a division under General Scott, who gave him honorable mention in the official report. At the beginning of the Civil War he was assigned to a military department composed of Pennsylvania, Delaware, Maryland, and the District of Columbia, and commanded a force near Harper's Ferry, with instructions to prevent the union of the Confederate forces under Johnston and Beauregard at Manassas Junction, but the union was effected and the battle of Bull Run followed. On the expiration of his commission as major-general of volunteers, July 27, 1861, he was mustered out of the service and retired to private life in Philadelphia. He was one of the largest mill-owners in the United States, and was interested in sugar-refineries and cotton-plantations. His *Narrative of the Campaign in the Shenandoah* was published in 1865. He died Aug. 7, 1881.

PATTERSON-BONAPARTE. See BONAPARTE, ELIZABETH PATTERSON, in these Supplements.

PATTI, ADELINA MARIA CLORINDA, a famous prima donna; born in Madrid, Spain, March 19, 1843.



MADAME PATTI.

Her father, a Sicilian, and her mother a native of Rome, were both operatic singers. As a child, she went with her parents to the United States and lived in New York City, where she received her early instruction in singing from her step-brother, Barilli, and her brother in law, Maurice Strakosch. When but seven years of age she made her first appearance at a concert in New York. She then made a tour of the British provinces with Strakosch and Ole Bull, and subsequently accompanied Gottschalk, the pianist, to the West Indies. In 1859 she made her first appearance, as Lucia, in Italian opera, at the Academy of Music, New York, and in 1861 appeared in London as Amina in *La Sonnambula*. She afterward sang in all the principal cities of France, Germany, Italy, Spain, Russia, Mexico, and South America. In 1868 she married, in London, the Marquis de Caux, a French nobleman, from whom she was divorced in 1878; in 1886 she married, in Wales, Ernesto Nicolini, an Italian tenor singer. During 1881-87 Patti appeared in opera in the United States and afterward in Mexico and South America. Her farewell tour in America was made in 1893. In 1894 she sang for the first time portions of Wagner's compositions. She erected a theater at Craig-y-Nos, Wales, her favorite residence. Patti's repertoire was confined chiefly to the Italian school, and it was in the lighter operas she achieved her brilliant success, owing largely to her youthful and charming appearance and manner. Since then her pure soprano voice

increased in mellowness and richness of tone, and she successfully undertook the highest impersonations on the lyric stage—always a favorite by her beauty, grace and artistic skill.—Her sister, CARLOTTA, a concert-singer, was born in Florence, Italy, in 1840. She made her first public appearance in New York City in 1861, and the following year sang in opera. In 1863 she went to England, where she sang in more than fifty concerts in London, and before the Queen. She subsequently sang in the principal cities of the Continent. Her voice was one of the highest sopranos known, stretching from C below the clef to G sharp in alto—over two octaves. In 1869 she returned to New York and afterward appeared frequently on both sides of the Atlantic. Though for the most part a concert-singer she occasionally sang in opera. In 1879 she married Ernst de Munck, the violoncellist. She died June 27, 1889.

PATTISON, MARK, an English scholar and author; born in Hornby, Yorkshire, in 1813; educated at Oriel College, Oxford; took his bachelor's degree in 1837, and elected a fellow of Lincoln College in 1839. He contributed to the columns of the *Quarterly*, the *Westminster* and the *Saturday Review*. His *Report on Elementary Education in Protestant Germany* appeared in 1859, and his paper on *Tendencies of Religious Thought in England, 1688-1750*, in *Essays and Reviews*, in 1860. In 1861 he was elected rector of his college, and the next year married Emilia Frances Strong, afterward Lady Dilke, who helped him to make Lincoln a social and intellectual center. Besides the books already named, he published *Suggestions on Academical Organization* (1868); *Pope's Essay on Man* (1869); and *Satires and Epistles* (1872); *Isaac Casaubon, 1559-1614* (1875); *Milton*, of the English Men of Letters Series (1879); the *Sonnets of Milton* (1883); and *Sermons* (1885). A volume of his *Memoirs* was published in 1885, and a collection of his *Essays* in 1889. He died at Harrowgate, July 30, 1884.—His sister, DORA WYNDLOW, a nurse, was born in Hauxwell, Jan. 16, 1832. The heroic devotion of Florence Nightingale kindled her enthusiasm, and in 1861 she started a life of labor for others as school teacher at Little Woolston. In 1864 she joined the sisterhood of the Good Samaritans at Coatham, and labored as nurse, first at North Ormesby, and in 1865 at Walsall. She braved the horrors of small-pox in 1868, and again in 1875, but her uncommon strength gave way, and she died in Walsall, Dec. 24, 1878. The workmen erected a monument to her memory in 1886.

PATTISON, ROBERT EMORY, an American lawyer; born in Quantico, Maryland, Dec. 8, 1850; graduated at the Central High School in Philadelphia in 1870; began to practice law in 1872; elected comptroller of the city of Philadelphia in 1877 and 1880; governor of Pennsylvania from 1883 to 1887, and again from 1891 to 1895.

PATTON, FRANCIS LANDEY, an American clergyman and educator; born in Warwick, Bermuda Islands, Jan. 22, 1843; educated at University College, Toronto, Canada; studied theology at Knox College, Toronto, and at Princeton Theological Seminary, New Jersey, graduating at the latter

institution in 1865. From 1865 to 1874 he was pastor of churches in New York and Brooklyn, and from 1874 to 1881 of the Jefferson Park Presbyterian Church in Chicago. He edited the *Interior*, a denominational paper, in Chicago, from 1873 to 1876, and was professor in the Presbyterian Theological Seminary of the Northwest, Chicago, from 1871 to 1881. While in Chicago his successful prosecution of Professor David Swing for heterodoxy brought him into general prominence as a theological writer and speaker, and



DR. PATTON.

procured him the appointment, in 1881, to the Stuart professorship, a chair especially founded for him at the Princeton Seminary. In addition to filling the duties of that department he also lectured on ethics at Princeton University, and in 1885 was made a professor of ethics in that institution. On the resignation of the presidency of the college by Dr. McCosh, Dr. Patton was chosen to succeed him and assumed the office in June, 1888. The degree of D.D. was conferred upon him by Hanover College, Indiana, in 1872, and that of LL.D. by Wooster University, Ohio, in 1878, and by Harvard University in 1889. He was a voluminous contributor to magazines and papers and published several works.

PATUXENT RIVER. See MARYLAND, Vol. XV, p. 603

PAUL, EPISTLES OF. See PASTORAL EPISTLES, Vol. XVIII, pp. 348-351; and the specific names of his other epistles, as GALATIANS, CORINTHIANS, etc., in this *ENCYCLOPÆDIA*.

PAULDING, a village and the capital of a county of the same name, west-northwestern Ohio, 40 miles N.W. of Lima and about 60 miles S.W. of Toledo, on the Cincinnati, Jackson and Mackinaw railroad. It is the center of a region producing corn, wheat, oats, butter, hay, wool, live-stock, and ship timber, and has manufactures of lumber. Population 1890, 1,879.

PAULDING, JOHN, an American patriot; born in New York City in 1758; served as a private soldier during the Revolution, and was three times taken prisoner. He was one of the captors of Major André of the British army, for which service Congress gave him a silver medal and granted him an annuity of \$200. He died in Staatsburg, New York, Feb. 18, 1818, and was buried in St. Peter's churchyard, near Peekskill, New York. In 1827 the corporation of the city of New York erected a monument over his grave, and an address was made by his nephew, William Paulding, who was then mayor.

PAULIST FATHERS, an American Roman Catholic missionary society, organized in New York City in 1858, and approved by Pope Pius IX. The society was originally and for some years afterward composed exclusively of priests, who, like its founder,

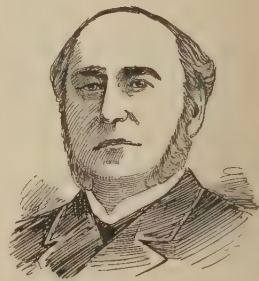
Father Isaac Thomas Hecker, were converts from Protestantism. They take no special vows, and can leave the order at will. They aim to adapt themselves to the usages and needs of American life. They are known collectively as *The Congregation of St. Paul the Apostle*.

PAULOWNIA, a genus of Japanese trees, of a single species, *P. imperialis* belonging to the family *Scrophulariaceæ*, or figworts. It is cultivated for ornament, has large heart-shaped catalpa-like leaves, violet flowers in a large terminal panicle, and turgid pods filled with numerous winged seeds.

PAULSEN, FRIEDRICH, a German educator; born in Langenborn, Schleswig, July 16, 1846; educated at the gymnasium in Altona and the universities of Erlangen and Berlin; professor of philosophy after 1893 in the University of Berlin. Recognized as authority in secondary and higher education, his contributions to the history of pedagogy were important, while his published works and numerous magazine articles ranked him foremost among German philosophers. His principal works are *Versuch einer Entwicklungsgeschichte der Kantischen Erkenntnisstheorie* (1875); *Geschichte des Gelehrten Unterrichts auf den Deutschen Schulen und Universitäten, vom Ausgang des Mittelalters bis auf die Gegenwart* (1885); *System der Ethik* (1889); *Einleitung in die Philosophie* (1892); *Wesen und Geschichte der Deutschen Universitäten* (1893), translated into English by Prof. E. D. Perry of Columbia College.

PAULUS, ÆGINETA. See ÆGINETA, Vol. I. p. 181.

PAUNCEFOTE, SIR JULIAN, a British jurist and statesman; born in Munich, Bavaria, Sept. 13, 1828; and educated at Paris, Geneva, and at Marlborough College. He was called to the bar at the Inner Temple in 1852, joined the Oxford circuit, and also practiced as a conveyancer. He was appointed attorney-general of Hongkong in May, 1865; acted as chief justice of the supreme court in 1869; and in 1874 was knighted by patent. He



SIR JULIAN PAUNCEFOTE.

was appointed chief justice of the Leeward Islands in 1873, and Assistant Under-Secretary of State for the Colonies in 1874. In 1876 he was appointed Assistant (legal) Under-Secretary of State for Foreign Affairs. He was created a C.B. and a K.C.M.G. in 1880, and in 1882 succeeded Lord Tenterden as Permanent Under-Secretary of State for Foreign Affairs. In 1885 he received the grand cross of the Order of St. Michael and St. George. In 1888 he was appointed British ambassador at Washington; in 1892 received the grand cross of the Bath for his diplomatic services, and in 1893 was raised to the rank of ambassador extraordinary and plenipotentiary to the United States. In 1894, during a visit home, he was sworn of the Privy Council.

PAUPERISM. See POOR-LAWS, Vol. XIX, p. 462, 481; and in these Supplements.

PAUROPIDÆ. See CENTIPEDES, Vol. V, p. 340.

PAVEMENTS. See ROADS AND STREETS, Vol. XX, pp. 582-588.

PAVY, OCTAVE PIERRE, an American naturalist; born in New Orleans, Louisiana, June 22, 1844; graduated at the University of Paris, France, in 1866; studied medicine and made large collections in natural history; completed his medical course in St. Louis, and in 1880 accompanied the *Gulnare* to the Arctic regions as surgeon and naturalist, where he made collections for the Smithsonian Institution. In 1881 he was commissioned acting assistant surgeon to the Greely expedition and spent three years with the party at Lady Franklin Bay, performing, also, the duties of a naturalist to the expedition. He made sledge-journeys to Lincoln Bay and vicinity, and in 1883 discovered Pavy Valley and Pavy River. The prolongation of the health and lives of the party at Cape Sabine were due to Dr. Pavy. Sixteen days before the rescue of the party, he died of starvation, June, 1884. His collections were left at Lady Franklin Bay.

PAWNBROKING, the loaning of money by a broker upon the deposit of goods or chattels as security for its repayment. The business existed among civilized nations in ancient times, and was regulated by laws designed to prevent extortion by the lender and to protect the borrower. Among the Hebrews, the lenders were forbidden to receive in pawn chattels, the want of which would expose the borrower to great hardships or privations. The business has existed among the Chinese for over fifteen hundred years, and is kept under strict regulations.

The first professional pawnbrokers among modern Europeans were the Jews. In England, for more than two hundred years after the Conquest, they charged from 45 to 65 per cent per annum. In 1275 they were forbidden to take interest, and in 1290 were expelled from the country. The business then fell into the hands of certain Italian traders or bankers in London, known as the Lombards, whose wealth became proverbial. The richest of them were the family of the Medici. It is said that the three golden balls which figure over every pawnshop were taken from the armorial bearings of the Medici family. The bankers of Lombard Street monopolized the business until the reign of Elizabeth; the trade was recognized by James I; during the reign of Charles I the goldsmiths did a profitable business in loaning on pawns and in discounting bills. The oppression by the pawnbrokers led to attempts to intrust the business exclusively to public institutions of a quasi-benevolent character, now called *monts-de-piété*, but without success. Pawnbroking was first regulated in England by statute in 1757. The law of 1872 repealed all previous ones, and affects all loans under ten pounds, except the parties, by special contract, in statutory form, agree to exclude the operation of the act as to profit and certain other particulars. The rate of profit is $2\frac{1}{2}$ per cent per month on loans up to forty shillings and $1\frac{3}{4}$ per cent on loans from forty shillings to ten pounds.

The first of the charitable institutions called *monts-de-piété*, and managed frequently by the gov-

ernment, was established on the Continent, at Padua, in 1491. The first opened at Rome was under Leo X. The institution extended to Florence, Milan, Naples and other cities. The plan was to advance small sums of money on pledges, but at a rate of interest barely sufficient to cover the working expenses, and any surplus was to be expended for charitable purposes. The system was introduced into Spain, France, Belgium, Germany, the Netherlands and Russia, and *monts-de-piété* still exist at Paris, Madrid, Brussels, Antwerp and other cities. The *mont* of Milan, nearly five hundred years old, had, in 1883, a capital of 335,500 Austrian florins. In 1873, forty six of these institutions in France made yearly loans of 600,000 francs. The more important are at Paris, Lyons and Marseilles. The trading capital is obtained by the issue of promissory notes at $2\frac{1}{2}$ per cent for money deposited by cash reserves, and by profit on the redemption and sale of pledges. The *monte de piedad* in Mexico loans money to the very poor without interest.

A comparison of the rules and charges of the *mont-de-piété* at Paris—the largest in the world—with the English pawnbroking system shows no striking superiority in the French institution. The *mont* at Paris charges a lower rate of interest and gives greater facilities for recovering stolen goods. On the other hand, officialism, which must prevail where a large staff is employed, makes it more difficult for the poor to obtain advances.

The system of pawnbroking which exists in the United States is borrowed directly from that which prevails in England, and is regulated by the laws of the several states. Usually, the mayors of cities have the power to grant licenses to pawnbrokers in their respective cities. In New York City—which represents the system in other cities of the United States—the rate of interest is limited to 25 per cent per annum on sums less than \$25, and to seven per cent on sums above \$25; yet the rate usually charged is three per cent per month, and there are further charges for storage, safe-keeping, etc. The unredeemed pledges must be sold at public auction. The amount received for any article over the pawnbroker's just claims must be returned to the borrower.

Provident institutions for the loan of money to the very poor, supported by subscriptions, and exacting no charge more than sufficient to pay the expense of management, have been established in New York City, with branches in other places. See also PLEDGE, Vol. XIX, p. 220.

PAWNEE, a city and the capital of Pawnee County, northeastern Oklahoma, on Bear Creek. Its nearest railroad station is Red Rock, on the Atchison, Topeka and Santa Fé railroad, about 25 miles northwest. Perry, 30 miles westward, is the nearest important city. Pawnee is of very recent growth, and in 1895 had a population of 1,250.

PAWNEES OR PANI, a tribe of North American Indians, comprising the four tribes of Lanks, Republican Panis, Grand Panis and Tapage Panis. Their original location was in the region of the Platte River. They constantly fought the Sioux, the Sacs and Foxes, the Arapahoes and the Kiowas. In

1833 they surrendered their lands south of the Nebraska to the United States government, and for a time lived peaceably on a reservation north of that river. Later, defeated by the Sioux, they retreated to the south of the Nebraska, and in 1876 moved into the Indian Territory. In 1870 they numbered about 3,000; in 1885, 1,045; and in 1895, 710. See also INDIANS, Vol. XII, pp. 827, 832.

PAWNEE CITY, a village and the capital of Pawnee County, southeastern Nebraska, about 60 miles S.E. of Lincoln, on the Burlington and Missouri River in Nebraska and the Chicago, Rock Island and Pacific railroads. It is situated in a farming and grazing district, producing corn, wheat, hay, butter, pork and live-stock. Building-stone, timber, peat and fire-clay are found. Population 1890, 1,550.

PAW PAW, a village and the capital of Van Buren County, southwestern southern peninsula of Michigan, on the Paw Paw River, and on the South Haven and Eastern railroad, 20 miles W.S.W. of Kalamazoo. It has an excellent water-power, flour-mill, large creamery, foundry and machine-shops, and a trade in wheat, lumber and fruit. Population 1890, 1,391; 1894, 1,406.

PAPPAW. See PAPA, in these Supplements.

PAWTUCKET, a city of Rhode Island, on Pawtucket River, about 4 miles N.E. of Providence. In 1890 Pawtucket had two lines of railways, the New York and New England and the New York, New Haven and Hartford. The returns for the same year showed 70 industries, in 347 establishments, capitalized at \$14,208,632, employing 7,633 persons, to whom were paid \$3,433,563, and turning out products valued at \$14,349,595. The leading industry is the manufacture of cotton goods, including cotton thread. Others include the manufacture of hosiery and knit-goods, dyeing and finishing of textiles, one establishment alone turning out 20,000,000 yards of calico annually; manufacture of foundry and machine-shop products; slaughtering and meat-packing. There is a large shipping trade in coal, lumber, bricks, cement, etc. The city has a public park, laid out at a cost of almost \$1,500,000; a public library, good public schools, three national banks with combined capital of \$800,000, and a like number of savings banks with aggregate deposits of over \$3,000,000; street-railways and electric-light plants, and three daily and four weekly newspapers. Population 1890, 27,633. See also PAWTUCKET, Vol. XVIII, p. 439.

PAXTON, a city and the capital of Ford County, northeastern central Illinois, 49 miles E. of Bloomington, and about 100 miles S.S.W. of Chicago, on the Illinois Central and the Lake Erie and Western railroads. It is an important shipping-point for farm produce and live-stock, has brick and tile works, carriage and plow factories and a flour-mill. The city has water-works and electric-light plant, and is the seat of Rice Collegiate Institute, a co-educational institution for secondary instruction, established by the Congregationalists in 1878. Population 1890, 2,187.

PAYER, JULIUS, an Austrian explorer; born in Schönau, Sept. 1, 1842. He was educated at the

Military Academy in Vienna, and entered the army as lieutenant in 1859; became professor of history at the Military Academy of Vienna in 1865, and in 1869 accompanied the German expedition to the North Pole, under Capt. K. Koldewey. In 1872 he was given, in conjunction with Weyprecht, the mission to ascertain if the North Pole could be reached by the way of an open polar sea, believed to exist east of Spitzbergen. (For an account of the expedition, see POLAR REGIONS, Vol. XIX, p. 323.) Payer retired from the army in 1875 and devoted himself to science. He published an interesting account of the expedition in the *Tegethoff*, besides other volumes on Arctic travel, its dangers and requirements. He died in 1883.

PAYN, JAMES, an English novelist; born in Cheltenham in 1830; educated at Eton, Woolwich Academy, and Trinity College, Cambridge, graduating in 1854. In 1855 he published a volume of poems; in 1858 succeeded Leitch Ritchie as editor of *Chambers's Journal*, and in 1882 Leslie Stephen as editor of the *Cornhill Magazine*. In *Chambers's* came out his first novel, *A Family Scapgrace*, and a few years afterward *Lost Sir Massingherd*, a story which increased the circulation of that journal by nearly twenty thousand. He wrote more than one hundred novels, among which are *Married Beneath Him*; *The Canon's Ward*; *Found Dead*; *A Country Family*; *Gwendoline's Harvest*; *Won, Not Wooed*; *Cecil's Tryst*; *At Her Mercy*; *By Proxy*; *Two Hundred Pounds Reward*; *The Heir of the Ages*; *The Mystery of Mirbridge*; etc. Mr. Payn also contributed to the *Nineteenth Century* and other periodicals. Though not of the highest merit, his novels are exceedingly popular.

PAYNE, HENRY B., an American lawyer and public man; born in Madison County, New York, Nov. 30, 1810. He was educated at Hamilton College, studied law, was admitted to the bar, and commenced practice at Cleveland, Ohio (1834); after 12 years he retired from the profession and became interested in manufacturing, railroads, and many other enterprises; was a member of the state senate of Ohio in 1849, the Democratic candidate for the United States Senatorship in 1851, and for governor in 1857; a prominent member of several Democratic conventions; was elected to Congress in 1875; and was United States Senator from 1885 to 1891. He died in Cleveland, Ohio, in September, 1896.

PAYNE, JOHN, an English poet; born in London in 1842; a translator, and poet of the neo-romantic school. Among his translations are *The Poems of François Villon* (1881); *The Book of the Thousand Nights and One Night* (9 vols., 1882-84); *Tales from the Arabic* (1885); *The Decameron of Boccaccio* (1886). Among his other works are *The Masque of Shadows* (1870); *Intaglios* (1871); *Songs of Life and Death* (1872); *Lautrec* (1878); *New Poems* (1880); *François Villon: A Biographical Study* (1881).

PAYNE, JOHN HOWARD, an American actor and dramatist; born in New York, June 9, 1792. At the age of 13 he edited a weekly paper, *The Thespian Mirror*, while acting as clerk in a counting-house.

For two years he attended Union College and published *The Pastime*. In 1809 he appeared in the character of Norval at the Park Theater, New York, and afterward on the stage at Boston and other cities. In 1813 he appeared at the Drury Lane Theatre, London, as Master Payne, the American Roscius, and for 20 years pursued a career of success as an actor, but with indifferent pecuniary results. While in England he wrote a number of dramas and operas, some of which were adaptations from the French. One of these, *Clari; or, The Maid of Milan*, contains the song, *Home, Sweet Home*, which has made his name immortal. Among his best plays are *Brutus*, *Virginus* and *Charles the Second*. In 1826-27 he edited, in London, a dramatic paper called *The Opera Glass*. In 1832 he returned to the United States and engaged in minor literary work. From 1841 to 1845 he was United States consul at Tunis, Africa, and was reappointed in 1851. There he died, April 10, 1852. His remains were removed to Washington, District of Columbia, in 1883, and interred in Oak Hill Cemetery, with the benediction of a thousand voices and instruments in *Home, Sweet Home*. In connection with this popular song is associated the fact that its author never had a home after the age of 13. A monument to his memory is in the cemetery of St. George, Tunis, as is also one over his grave in Washington.

PAYSON, a city of Utah County, central Utah, near the southern end of Utah Lake, on the Rio Grande Western and Union Pacific railroads, 66 miles S. of Salt Lake City. It is a trade center of a mining, agricultural and dairying region, and has manufactures of furniture. Population 1890, 2,135; with precinct, 1895, 2,644.

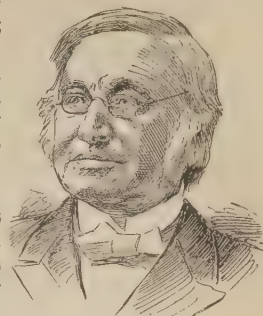
PAZAND MSS. See PAHLAVI, Vol. XVIII, p. 135.

PAZ-SOLDAN, PEDRO, a Peruvian poet; born in Lima in 1839. In 1850 he went to Europe to pursue literary studies at Madrid, Paris and Rome. After returning home in 1863 he served in various government offices at Lima, and was sometimes sent abroad in a diplomatic capacity. To the Peruvian journals he contributed many sketches of travels and manners. His *Poesías Peruanas* (1867) give graphic pictures of the people and scenery of Peru. His *Chispazos* is a little volume of sonnets and epigrams. He also published a *Diccionario de Peruanismos*, in which he illustrated the variations of Peruvian speech from pure Castilian.

PEABODY, a city of Marion County, southeastern central Kansas, 18 miles N.E. of Newton and about 50 miles S.W. of Emporia, on the Atchison, Topeka and Santa Fé and Chicago, Rock Island and Pacific railroads. It is in a rich agricultural and cattle-raising district, and the most important shipping-point in the state for corn-fed cattle and hogs; is the seat of the Kansas silk station; and has a foundry, windmill factory, creameries and flour-mills. Population 1890, 1,474; 1895, 1,361.

PEABODY, a town of Massachusetts, on the Boston and Maine railroad. Population 1890, 10,158; 1895, 10,507. See PEABODY, Vol. XVIII, p. 441.

PEABODY, ANDREW PRESTON, an American clergyman and author; born in Beverly, Massachusetts, March 19, 1811; graduated at Harvard in 1826; studied divinity at Cambridge; pastor of the South Parish (Unitarian) Church in Portsmouth, New Hampshire, from 1833 to 1860; preacher to Harvard University and professor of Christian morals from 1861 to 1881, when he resigned to give his whole time to literary work, and retired as emeritus professor. He was acting president in 1862 and 1868-69. For 11 years from 1852 he edited the *North American Review*, to which and to other periodicals he contributed very largely. Among his published works are *Lectures on Christian Doctrine* (1844); *Sermons of Consolation* (1847); *Conversation: Its Faults and Graces* (1856); *Christianity the Religion of Nature* (1864); *Sermons for Children* (1866); *Manual of Moral Philosophy* (1874); *Christianity and Science* (1874); *Harvard Reminiscences* (1888); and *Harvard Graduates Whom I Have Known* (1890). He died in Boston, Massachusetts, March 10, 1893.



REV. A. P. PEABODY.

PEABODY, ELIZABETH PALMER, an American educator; born in Billerica, Massachusetts, May 16, 1804; sister of Mrs. Nathaniel Hawthorne and Mrs. Horace Mann; taught in Bronson Alcott's school. She was one of the first to introduce into the United States the kindergarten system, and published a number of works, among which are *The Kindergarten in Italy* (1872); *Letters to Kindergartners* (1886); *Esthetic Papers* (1849); *Chronological History of the United States* (1856); *Last Evening with Allston, and Other Papers* (1887); and edited Mrs. Mann's *Guide to the Kindergarten* (1877). She died in Jamaica Plain, Massachusetts, Jan. 3, 1894.

PEABODY, FRANCIS GREENWOOD, an American clergyman and educator; born in Boston, Massachusetts, Dec. 4, 1847; graduated at Harvard in 1869 and at Harvard Divinity School in 1872; pastor of the First Parish Church in Cambridge, Massachusetts; overseer and preacher of Harvard University; professor of theology and professor of Christian morals. He endeavored to connect the study of sociology with that of ethics and religion, and as a writer and speaker was attractive and persuasive.

PEABODY EDUCATION FUND. In 1867, George Peabody (q.v., Vol. XVIII, p. 442) established a fund of \$2,100,000, increased in 1869 to \$3,384,000, to be devoted to education in the Southern states of the Union. The fund was placed under the control of 16 trustees. The general agent of the fund, with headquarters at Washington, District of Columbia, has charge of the distribution of the fund in the Southern states. In its earlier history, the chief aim of the fund was to encourage and secure the establishment of public school systems for the free education of all children. That having

been accomplished, the income of the fund is now used for the training of teachers through normal schools and teachers' institutes. Up to October, 1889, the fund had furnished \$1,800,000 in aid of schools. For 1889-90 the fund stood \$2,075,175 in good securities and \$607,000 in "inactive" bonds.

PEACE PRESERVATION ACT. See **HOME RULE**, in these Supplements.

PEACE RIVER, a large river of Canada. It rises in two branches, in the Rocky Mountains, in northern British Columbia, and flows northeast to the outlet of Lake Athabasca, where it takes the name of Slave River, turns north and empties into Great Slave Lake by five widely separated mouths. The delta thus formed is, with that of the Athabasca River, the most fertile part of the country. The river has a length of about eight hundred miles, but it is much encumbered with rapids, although navigable by small steamers for some distance. The Peace River was followed by Sir A. Mackenzie in his expedition of 1792-93.

PEACH, a tree and its fruit; for a description of which, see **PEACH**, Vol. XVIII, pp. 442, 443. In the United States they cannot be raised profitably north of lat. 43° N. They reach their highest perfection in the middle states. Many peaches are dried, canned or made into brandy. The California product, famous the world over, is large, and of excellent quality. Those raised in Missouri, Ohio, Illinois, Michigan and in neighboring states are generally smaller than the Californian peach. According to the United States census report for 1890, there were, that year, 53,885,597 bearing trees in the whole country, from which 36,367,747 bushels of peaches were sold. Of this product, 5,525,119 bushels were raised in Georgia. The chief states besides Georgia were, in order, in amount of product, Texas, Arkansas, North Carolina, Tennessee, Alabama, Kansas, California, Missouri, South Carolina, Mississippi, Maryland and New Jersey. The last-named state sold 776,078 bushels.

PEACH-CURL, a fungus disease of peach leaves and twigs, which causes them to become swollen and deformed. The attacking fungus is *Exoascus deformans*, which penetrates the tissues, and both irritates and absorbs. Spraying is recommended, and is a possible preventive, but the attacked plants should be removed.

PEACH-YELLOWS, a dangerous contagious disease of peach trees, causing the leaves to turn yellowish green, the fruit to become discolored, and the whole tree to die within a year or two, unless checked. The trees die from the extremities down, and no cause is certainly known, though it is supposed to be a bacterial disease, and no cure can be discovered.

PEAK, a general name given to the hilly district of northwest Derbyshire, England. Measuring some 30 by 22 miles, it is watered by the Dove, Derwent and Wye, and culminates in Kinder Scout (2,082 feet). There is a diversity of wild and rugged mountains and beautiful and fertile valleys. Valuable marble is obtained in the district, and there are deposits of metallic ores, especially of galena, which is said to have been mined here since the days of

the Roman occupation. The Peak Cavern, or Devil's Hole, near Castleton, penetrates 750 yards, and consists of a series of subterranean chambers, which can only be explored by torchlight; and crowning a rock above the village is Peveril Castle, so named from its first lord, a natural son of William the Conqueror. 'The wonders of the Peak' were celebrated early by Thomas Hobbes and Charles Cotton, and have been immortalized by Sir Walter Scott in his *Peveril of the Peak*.

PEALE, CHARLES WILSON, an American painter and naturalist; born in Chestertown, Maryland, April 16, 1741. He was at first a saddler, but turned to art and established himself in Boston, where he studied under J. S. Copley. He afterward went to London and was instructed by Benjamin West. He served in the American army during the Revolution, and for a time after its close devoted himself to the study of natural history. He engaged in many trades, and was famous for his versatility. He painted portraits of Washington and of his principal officers, with whom he served. Among his portraits are ones of John Hancock, Robert Morris, Baron Steuben and Alexander Hamilton. He was a popular lecturer, a manufacturer, an ingenious inventor and a creditable scientific writer. He died in Philadelphia, Pennsylvania, Feb. 22, 1827.

PEALE, REMBRANDT, an American portrait-painter, son of the preceding; born in Bucks County, Pennsylvania, Feb. 22, 1778. He began his life-work in 1795, afterward studied in London under Benjamin West, and spent a great portion of his time in Europe. He painted a portrait of Washington in 1795, and afterward of Baron Cuvier, Thomas Jefferson, Commodore O. H. Perry and Stephen Decatur. His portrait of Washington, painted in 1823, was purchased by Congress for \$2,000. Among his groups and figures are *Napoleon on Horseback* (1810); *Jupiter and Io* (1813); *Court of Death* (1820); and the *Roman Daughter*. Like his father, he did not confine himself to art, but also engaged in the study of natural history. He wrote *An Account of the Skeleton of the Mammoth* (1802); *Reminiscences of Art and Artists* (1845); and other works. He died in Philadelphia, Oct. 3, 1860.

PEANUT AND PEANUT-OIL. See **GROUND-NUT**, Vol. XI, p. 221.

PEAR. The fruit of the pear tree (*Pyrus communis*) tapers toward the stem, and is not sunk in a cavity at the base, as in the apple. It has not the firmness of the apple, but it is more sugary and melting. Near its core the pear has a hard concretion composed of indurated cells. The pear is an ancient fruit. At the present day more than 3,000 varieties of pears are enumerated in the catalogues, though only about twenty of these are in practical cultivation. Among the varieties widely cultivated for sale, the greatest favorite is the Bartlett, which is notable for its size, lusciousness and abundant bearing. Ninety per cent of the pears grown in the United States for sale are of this variety. Another smaller pear is the Seckel. This variety is traced to a single tree in the suburbs of Philadelphia. It is of unsurpassed flavor. As a rule, pears are better if picked when just mature, and then ripened in the house.

The pear has a wide range of distribution. It flourishes equally on the shores of the South Atlantic and on the highlands of the interior. Pear trees are most largely cultivated in New York and California. The latter state is best adapted to their culture, and produces pears in large quantities and of extraordinary sizes. Many California pears are shipped to the East, and still greater quantities are preserved by canning, for which they are excellently suited, since canning preserves much of their original flavor. According to the United States census report for 1890, there were, that year, 5,115,055 bearing trees in the United States, which produced 3,064,375 bushels. New York headed the list of states, with 588,767 bushels, followed, in the following order, by California, Ohio, Michigan, Indiana and Pennsylvania. See also PEAR, Vol. XVIII, pp. 445, 446, and HORTICULTURE, Vol. XII, p. 274.

PEARCE, CHARLES SPRAGUE, an American artist; born in Boston, Massachusetts, Oct. 13, 1851. He studied under Bonnat in Paris, and traveled extensively in Europe and Algiers. Among his works, in recognition of the merit of which he received many honors, are *Death of the First-Born of Egypt* (1877); *Decapitation of John the Baptist* (1881); *Toilers of the Sea* (1884); and *St. Genevieve* (1887).

PEA RIDGE, Arkansas, the scene of a battle fought March 6 to 8, 1862, in which the Confederates, under General Van Dorn, were defeated by the Union forces under General Curtis. The Union troops numbered about 10,000, while the Confederates had 20,000, inclusive of 6,000 Cherokee Indians. The engagement was begun by an advance on the part of the Confederates toward Sugar Creek, where the Union army was encamped. The Union left, under the immediate command of Sigel, was first attacked, but succeeded in repulsing the Confederates. The Union right, under Carr, was, however, driven back. A movement by Sigel placed the Confederates in a cross-fire and compelled them to retire. Both forces lost heavily.

PEARL-ASHES or CARBONATE OF POTASH. See POTASSIUM, Vol. XIX, pp. 589.

PEARL-FISHERIES. See PEARL, Vol. XVIII, pp. 446-448.

PEARL RIVER. See CANTON, Vol. V, p. 37.

PEARL RIVER, a river formed by the union of several small streams in Neshoba County, eastern central Mississippi; flows southwesterly to Jackson, where it begins a southerly course, in its southern part forming a part of the boundary between Mississippi and Louisiana. It empties into the Gulf of Mexico, east of Lake Pontchartrain, after flowing a distance of 400 miles, the distance being so great on account of the winding course. It is navigable for flatboats through a fertile cotton region as far as Jackson. The river is subject to overflows in the lower portions.

PEARL RIVERS, the pseudonym of NICHOLSON, MRS. ELIZA JANE; q.v., in these Supplements.

PEARL-SHELL FISHERIES. See MOTHER-OF-PEARL, Vol. XVII, p. 2.

PEARL-WHITE. See BISMUTH, Vol. III, p. 791.

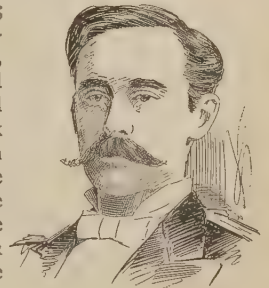
PEARLYTE. See IRON AND STEEL, in these Supplements.

PEARSALL, a town and the capital of Frio County, southern Texas, 54 miles S.W. of San Antonio and about 100 miles N.N.E. of Laredo, on the International and Great Northern railroad. It is the trade center for a district devoted to grazing and farming. Population 1890, 766.

PEARSON, JOHN LANGBOROUGH, a British architect; born in Durham, England. He studied architecture in the office of Ignatius Bonomi in Durham, and later established himself in London. His first work to attract public attention was Holy Trinity Church, Westminster, erected in 1850. He designed the schools of St. Peter's, Vauxhall, in 1860; in this building he introduced the plan of groining throughout with stone and brick—the first instance of this method in modern building. He was elected a member of the principal British architects' societies, and was made a knight of the Legion of Honor. Among his later buildings are Lincoln Cathedral, the west side of Westminster Hall, and he was architect for Westminster Abbey.

PEARSONS, DANIEL KIMBALL, an American philanthropist; born in Bradford, Vermont, April 14, 1820. After graduating from the Woodstock, Vermont, Medical College, he practiced his profession in Chicopee, Massachusetts, until 1857, when he removed to Illinois, and settling in Ogle County, engaged in farming. In 1860 he removed to Chicago, where he accumulated a fortune in the real estate business. As alderman from 1877 to 1880, his financial ability was of great service to the city in tiding over bad conditions. He was always generous with his money, aiding all benevolent enterprises he deemed worthy. In 1896 his gifts to various sources amounted to \$1,600,000. Among the institutions benefited by him in amounts varying from \$50,000 to \$280,000 are Chicago Theological Seminary, Lake Forest University, Presbyterian Hospital and Presbyterian Theological Seminary, all of Chicago; Beloit College, Wisconsin; Colorado Springs College, Colorado; Pacific University, Oregon; Whitman College, Washington; and Mount Holyoke College, Massachusetts.

PEARY, ROBERT EDWIN, an American Arctic explorer; born in Pennsylvania in 1854; removed with his parents to Maine; graduated at Bowdoin College; in 1885 was selected, by competition, as a civil engineer for the United States navy, with the rank and pay of lieutenant. In 1886, 1891 and 1893 he made expeditions to the polar regions, which are noted in the article, POLAR EXPLORATIONS, in these Supplements. From the last expedition he returned with the "Peary relief expedition," in the steamer *Kite*, to St. John's, Newfoundland, Sept. 21, 1895. The relief expedition was in charge of Emil Diebitsch, brother of Mrs. Josephine Peary, who accompanied her husband in his expeditions, and published an account of the first in *My Arctic Jour-*



LIEUT. ROBERT E. PEARY.

nal (1893). In May, 1896, Lieutenant Peary made a very successful expedition to Greenland for the purpose of collecting natural history specimens, returning to Sydney, Cape Breton, September 27th. His report of his reconnaissance of the Greenland ice in 1886, and his report on the North Greenland expedition, are well known.

PEARY EXPEDITION. See POLAR EXPLORATIONS, in these Supplements.

PEASANTS' WAR. See GERMANY, Vol. X, p. 495; and LUTHER, Vol. XV, p. 78.

PEAT. See FUEL, Vol. IX, p. 808; and GEOLOGY, Vol. X, pp. 238, 290.

PEA-WEEVIL. See WEEVIL, in the Supplements.

PECAN (*Carya olivæformis*), a North American tree, being one of the hickories. It is a handsome, lofty tree, growing to the height of 70 feet, with a straight trunk and leaves of from 13 to 15 leaflets. It abounds on the rich bottom lands from Indiana and Illinois southward to Mississippi, and thrives especially in Arkansas and the Indian Territory. It is the largest of the hickory trees; but its wood is of little use except for fuel. The fruit of the pecan-tree is the most palatable of all the hickory nuts. It is sweet, of an agreeable flavor, and has a thin, easily-broken, yellowish-brown shell, without the internal partitions of the ordinary hickory-nut. The pecan is extensively raised for sale in the Southern states. See also HICKORY, Vol. XI, p. 790.

PECATONICA, a village of Winnebago County, northern Illinois, on Pecatonica River, and on the Chicago and North-Western Railroad, midway between Freeport and Rockford. It is in an agricultural and stock-raising district; is engaged in pork-packing, and has a large shoe factory. Population 1890, 1,059.

PECCHIO, GIUSEPPE (1785-1835). See POLITICAL ECONOMY, Vol. XIX, p. 401.

PECH, HENRIETTA, or in Bohemian, JINDRISKA PECHOVA, a Bohemian poetess; pseudonym ELISKA KRASNOHORSKA. See SLAVS, Vol. XXII, p. 152.

PECHI-LI, GULF OF, a wide, shallow basin forming an arm of the Yellow Sea, surrounded on three sides by the provinces of Shan-tung, Pechi-li and Shing-king, in northeastern China. The Hwang-ho enters the gulf on its southwestern shore. With its northern extension, known as the Gulf of Liau-tung, the Gulf of Pechi-li has a length of about 290 miles. See CHINA, Vol. V, p. 633.

PECK, HARRY THURSTON, an American philologist; born in Stamford, Connecticut, in 1856; graduated at Columbia College, New York, in 1881. He was appointed instructor in Latin in Columbia in 1882; later he was lecturer on Biblical Hebrew; succeeded Charles Short in the Latin chair; and after study in Berlin was elected professor of Latin language and literature. He was also lecturer in classical philology in Barnard College for Women. He was a trustee and one of the original incorporators of the Columbia University Press and secretary of the faculty of Columbia College. Among his published works

are *The Semitic Theory of Creation* (1885); *Suetonius* (1889); *Latin Pronunciation* (1890); and numerous papers, addresses, etc. In conjunction with Prof. E. M. Pease, Professor Peck brought out a series of Latin classics for college use; edited *Harper's Dictionary of Classical Literature and Antiquities* (1896); the *University Bulletin* (1891-95); *Classical Studies* (1894); and in 1895 became editor of the *Bookman*.

PECK, JESSE TRUESDELL, an American Methodist Episcopal bishop; born in Middlefield, New York, April 4, 1811. He was ordained a minister of the Methodist Church in 1832. From 1837 to 1852 he was successively principal of Gouverneur Seminary, Troy Academy, and Dickinson College, Pennsylvania. He was for a time pastor in Washington, District of Columbia, and New York City; later in San Francisco and Sacramento, California. He returned to the East, and in 1872 was chosen bishop. He was one of the founders of Syracuse University. Among his published writings are *The Central Idea of Christianity* (1855); *The True Woman* (1857); and *The Great Republic* (1868).

PECK, JOHN MASON, an American clergyman and author; born in Litchfield, Connecticut, Oct. 31, 1789; licensed as a Baptist preacher in 1811; ordained two years later, and removed in 1817 to St. Louis, where he organized the First Baptist Church in 1826; aided in the founding of Shurtleff College at Upper Alton, Illinois; and of the theological school at Covington, Kentucky; received the degree of D.D. from Harvard in 1853. He edited *The Pioneer* and *The Illinois Sunday School Banner*, and published *Guide for Emigrants* (1831); *Gazetteer of Illinois* (1834, 1837); *New Guide for Emigrants to the West* (1836); *Father Clark; or, The Pioneer Preacher* (1855). He died in Rock Spring, Illinois, March 15, 1858. Rufus Babcock of Philadelphia published, in 1864, *Forty Years of Pioneer Life: Memoir of John Mason Peck, D.D.; edited from his Journal and Correspondence*.

PECOS, a town and the capital of Reeves County, western Texas, on the Pecos River, at the junction of the Pecos Valley with the Texas and Pacific Railroad, 135 miles W. of Big Springs. It is the trade center for an extensive district devoted to agriculture, and sheep and cattle raising. Population 1890, 393; estimated in 1895, 1,000.

PECOS RIVER. See NEW MEXICO, Vol. XVII, p. 400; and IRRIGATION in these Supplements.

PECQUET, JEAN (1620-74). See HARVEY, Vol. XI, p. 505.

PECTIN AND PECTOSE. See JAMS and JELLIES, Vol. XIII, p. 564; and BOTANY, Vol. IV, p. 88.

PECTOSE AND PECTIC ACID. A ferment substance found in ripening plants, as in the carrot, the character of which is somewhat obscure. It acts upon the pectose of unripe fruits and vegetables and produces *pectin*, or plant-jelly. It is a semi-solid, and is not known to crystallize. Pectin, under alkaline reaction, give rise to two gelatinous acids, with these probable chemical formulas;

namely, *pectosic acid* ($C^{32}H^{40}F^{28} + 3H^2O$) and *pectic acid* ($C^{16}H^{20}O^{18}$).

PEDAGOGICS. See **EDUCATION**, Vol. VII, pp. 677, 678.

PEDEE, the general name given to two rivers, distinguished as the Great Pedee and Little Pedee. The former rises in southern North Carolina, and is known as the Yadkin until it enters South Carolina, flowing in a southeasterly direction. Continuing in the same direction through South Carolina, it empties into Winyaw Bay, in Georgetown County. It is about 415 miles long, and is navigable for small vessels for about 200 miles. The principal tributaries of the Great Pedee are the Waccamaw and Little Pedee. The latter rises in North Carolina, flows southerly through Robeson County, in the latter state, forms the western boundary of Harry County, South Carolina, and joins the Great Pedee at the southern extremity of Marion County.

PEDERSEN, CHRISTIAN. See **DENMARK**, Vol. VII, p. 90.

PEDICULATI. See **ICHTHYOLOGY**, Vol. XII, p. 690.

PEDIGREES AND PEDIGREE-TRACING. See **GENEALOGIES, AMERICAN**, in these Supplements.

PEDIMENT. See **ARCHITECTURE**, Vol. II, p. 469.

PEDIPALPI, an order of arachnids, found in the warmer regions of the earth. They are often called scorpion-spiders or whip-scorpions. Their habits are not well known. There are two genera, *Phrynus* and *Thelyphonus*, the latter occurring within the United States.

PEDRARIAS OR DANILA. See **BALBOA**, Vol. III, p. 274.

PEDRO I (1798-1834). See **BRAZIL**, Vol. IV, pp. 232, 233.

PEDRO II, DE ALCANTARA, the last Emperor of Brazil; born at Rio de Janeiro, Dec. 2, 1825; son of Pedro I of Braganza and Bourbon, and of Leopoldina, Archduchess of Austria; proclaimed emperor upon the abdication of his father, April 7, 1831. The government was at first administered by a council of regency, and afterward by one regent. On July 23, 1840, Pedro was declared of age by the



DOM PEDRO II.

Chambers, and assumed the sovereign power when not quite 15. In 1843 he was married to the Princess Theresa Christina Maria, sister of Francis I, King of Naples, from which union were born two sons (who died young), and two daughters. The firm and judicious attitude he assumed in 1862, in the quarrel which broke out between his government and that of Great Britain, which was settled in his favor by the arbitration of the King of the Belgians, tended greatly to consolidate his power. In 1865 Dom Pedro en-

tered into an alliance with Uruguay and the Argentine Republic against the Paraguayans under Lopez. The war began in 1866, and raged with varying fortunes down to March 1, 1870, when it was brought to a close by the death of Lopez. In 1871 Dom Pedro made the tour of Europe, visiting London, Paris, Florence, Rome, Brussels, and other capitals, and in 1876 he visited the United States. The most important event of his reign was the issuing of an imperial decree in 1871 for the gradual but total abolition of slavery in Brazil. On Nov. 15, 1889, a peaceful revolution occurred, Brazil became a republic, and Dom Pedro retired from the country. He was granted a pension, which he would not accept. He died Dec. 5, 1891, in Paris, France. See also **BRAZIL**, Vol. IV, pp. 233, 234.

PEEKSKILL, a manufacturing village in Cortland township, Westchester County, southeastern New York, lies on the east bank of the Hudson, 43 miles above New York City, and on the New York Central and Hudson River railroad. The village has twelve churches, good public school, a military academy, St. Gabriel's (Protestant Episcopal), a boarding-school for young ladies, charitable institutions, a public library, banks, water-works and electric lights. A church dating from 1767, and the Van Cortlandt mansion, are among its principal buildings. The important industries are iron foundries, machine-shops, flour-mills, blank-book establishments, stove-works and cigar factories. Population 1890, 9,676.

PEEL, ARTHUR WELLESLEY, VISCOUNT, a British statesman; born in 1829, being the son of the celebrated Sir Robert Peel; was educated at Elton and Balliol College, Oxford; entered Parliament in 1865; was Parliamentary secretary to the Poor-Law Board from 1868 to 1871; secretary of the Board of Trade (1871-73); patronage-secretary of the Treasury (1873-74); under-secretary for the Home Department (1880); Speaker of the House in 1884; re-elected in 1886 and 1892, and retired in 1895; received the thanks of the House, a peerage and a pension of \$20,000, and presented with the freedom of the city of London, July, 1895.

PEEPUL, PIPPUL OR BO, a tree. See **FIG**, Vol. IX, p. 154.

PEET, HARVEY PRINDLE, an American educator; born in Bethlehem, Connecticut, Nov. 19, 1794; graduated from Yale in 1822; became an instructor of the deaf and dumb at the Hartford Asylum, and some time after superintendent there. In 1831 he was appointed principal of the deaf and dumb institution in New York City, which position he resigned in 1868, becoming then emeritus principal. The University of New York bestowed upon him the degree of LL.D. in 1849, and the National Deaf Mute College that of Ph.D. in 1871. His works include *Course of Instruction for the Deaf and Dumb* (1844-46) and *Legal Rights, etc., of the Deaf and Dumb* (1856); and contributed to the *American Annals for the Deaf and Dumb* and the *American Journal of Insanity*. He died Jan. 1, 1873, in New York City.

PEEWIT. See GULL, Vol. XI, p. 274; and LAPWING, Vol. XIV, p. 308, note.

PEGMATITE. See GRANITE, Vol. XI, p. 49.

PEH-CHELE or CHIH-LI, a province. See CHINA, Vol. V, p. 633.

PEHLEVI. See PAHLAVI, Vol. XVIII, pp. 134-136.

PEIHO, a river. See CHINA, Vol. V, p. 632.

PEINE FORTE ET DURE. See TORTURE, Vol. XXIII, p. 465.

PEIPUS, a Russian lake. See PSKOFF, Vol. XX, p. 35.

PEIXOTO, FLORIANO, a Brazilian statesman; born in Alagoas in 1842; received a military



GEN. F. PEIXOTO.

education at Copacabana; entered the Brazilian army, serving through the war with Paraguay (1865-70), distinguishing himself at the battle of Aquidaban, March 1, 1870, where he was severely wounded. He then resigned to look after his estate; rejoined the army after the liberation of his slaves had reduced him to poverty. He supported the republic and was nominated a senator; became a Minister of War in 1890; elected Vice-President of the republic in 1891; opposed President Fonseca, who resigned, Nov. 23, 1891, Peixoto being his successor. In 1893 he vetoed, on constitutional grounds, a bill meant to prevent his re-election. Though several outbreaks occurred, he was able to suppress them, and retired at the end of his term of office, on the election of his successor, Prudente de Moraes. He died June 29, 1895.

PEKIN, a city and the capital of Tazewell County, northern central Illinois, on the left bank of the Illinois River, 160 miles S.W. of Chicago, 56 miles N. of Springfield, and 10 miles below Peoria. It is a prominent railroad center, being located on the Atchison, Topeka and Santa Fé, Chicago, Peoria and St. Louis, Cleveland, Cincinnati, Chicago and St. Louis, Peoria, Decatur and Evansville, Peoria and Pekin Union railroads, all of which have made large and costly improvements, including depots, warehouses, etc., and add greatly to the amount of business annually transacted there. The city has 9 churches, 2 national banks, 3 daily and 4 weekly papers, a courthouse and jail, a high school and electric lights. It also contains foundries and machine-shops, cigar manufactories, hominy-mills, saw-mills, sash, door and blind factories, carriage factories and farming implement manufactories, distilleries, rolling-mills, marble-works, lumber-yards and soda-water factories. Large invoices of highwines, grain, coal and other products are shipped to Pekin, thence to the South and Southwest by rail and river, and to other points in the United States. Population 1890, 6,347.

PE LA. See WAX, Vol. XXIV, p. 459.

PELAGIANISM. See PELAGIUS, Vol. XVIII, p. 472.

PELARGONIC ACID AND ETHER. See CENANTHIC ACID, Vol. XVII, p. 731.

PELARGONIUM. See HORTICULTURE, Vol. XII, pp. 263, 264.

PELASGIANS. See GREECE, Vol. XI, p. 90; ITALY, Vol. XIII, p. 444.

PELECANIDÆ. See PELICAN, Vol. XVIII, pp. 474, 475.

PELEUS. See ACHILLES, Vol. I, p. 95.

PELION, a lofty range of mountains in Thessaly in the district of Magnesia, Greece. Its sides were covered with forests of oak, chestnut, beech, elm, plane and pine. On its summit was a temple of Jupiter Actæus, whose worshipers went in procession once a year to the temple, covering themselves with thick skins on account of the severe cold. Near the summit Mount Pelion, Chiron, the wisest of all the centaurs, resided in a cave, where he stored the rare medicinal plants that grew thickly on the mountain's sides. From the timber grown on Mount Pelion was built the ship that went forth with its adventurers to search for the golden fleece. In Greek mythology, the giant sons of Aloeus (the son of Neptune and Canace) in their wars with the gods in their attempt to scale heaven are said to have essayed to pile Ossa and Olympus on Pelion, or Pelion and Ossa on Olympus. Mount Pelion, the highest peak of the range, is 5,310 feet high. The modern name of the range is Plessidi.

PELLA. See MACEDONIA, Vol. XV, p. 137.

PELLA, a city of Marion County, south central Iowa, 47 miles E.S.E. of Des Moines, on the Chicago, Rock Island and Pacific railroad. It is in an agricultural region and the center of a variety of manufacturing interests, among the important industries being stone-quarrying, grape-culture and the manufacture of flour and lime. Pella is the seat of Central University of Iowa (Baptist), a co-educational institution established in 1853. It had in 1894, 11 instructors, 175 students and a library of 5,000 volumes. Population 1890, 2,408; 1895, 2,606.

PELLITORY, the common name of species of *Parietaria*, a genus of weedy plants of the family *Urticaceæ*, or nettles. *P. Pennsylvanica* is the American representative of the genus, while *P. officinalis* of Europe has a certain medical reputation. *Anacyclus pyrethrum*, a plant of the eastern Mediterranean region, of the family *Compositæ*, is the ordinary pellitory of commerce, used in benumbing nerves.

PELOPONNESIAN WAR. See GREECE, Vol. XI, p. 101-103.

PELOPONNESUS. See GREECE, Vol. XI, pp. 81, 93, et seq.

PELOTAS, a town of Rio Grande do Sul, extreme southern Brazil, on the São Gonçalo, a river connecting lakes Patos and Merim, about 20 miles by rail N.W. of the city of Rio Grande do Sul. Vessels to reach Pelotas must cross the Rio Grande bar, where the depth of the water is

fluctuating. The town is the center of the meat-drying industry; has huge establishments for the curing of beef, of which large quantities are shipped. Besides the jerked beef, the other exports include bones, hides, horns and tallow. The city is well laid out, and is one of the handsomest and richest in Brazil. Estimated population, 45,000.

PELS, ANDRIES, a dramatist. See HOLLAND, Vol. XII, p. 96.

PELVIS. See ANATOMY, Vol. I, p. 829.

PEMBERTON, JOHN CLIFFORD, an American soldier; born in Philadelphia, Pennsylvania, Aug. 10, 1814; graduated at West Point in 1837; served in the Seminole and Mexican Wars; became a lieutenant in the war in Florida; in the Mexican war; in Florida again against the Seminoles; then in southern garrison duty until April 29, 1861, when he resigned. Siding with the Confederates, he was commissioned a colonel of a cavalry regiment, and was on the staff of General Joseph Johnston; became a lieutenant-general; commanded in the Mississippi district, being defeated at Champion Hills and Big Black, on May 16 and 17, respectively; defended Vicksburg against the assault of the Federal troops, but yielded to General Grant, July 4, 1863. After the war he was an inspector of artillery; farmed in Virginia; in 1876 removed to Philadelphia; and died at Penlynn, near that city, July 13, 1881.

PEMBINA, a city and the capital of Pembina County, northeastern North Dakota, on the Red River of the North, at the mouth of the Pembina River, about 70 miles below Winnipeg, Manitoba, with which it has steamboat communication, and on the Northern Pacific railroad. It is situated in a wheat-raising district, and is an important grain-shipping point. Population 1890, 670.

PEMBROKE, a village of Pembroke township, Washington County, southeastern Maine, 10 miles N.W. of Eastport, and 20 miles S.E. of Calais, on Passamaquoddy Bay. Its nearest railroad station is Calais, on the St. Croix and Penobscot railroad, but it has water communication with coast towns. It is the seat of an extensive iron and nail manufactory. Population of the township in 1890, 1,513.

PEMBROKE, a village of Pembroke township, Merrimac County, southeastern central New Hampshire, on the Merrimac River, at the mouth of the Suncook River, five miles S.S.E. of Concord. It is the seat of an academy. The township contains the villages of East and West Pembroke, is intersected by the Boston and Maine railroad, and had a population in 1890 of 3,172.

PEMBROKE, a town and the capital of Renfrew County, northeastern Ontario, Canada, on the right bank of the Ottawa River, 96 miles above Ottawa, and on the Canadian Pacific railroad. The town is the center of a rich lumber district, and is furnished with excellent water-power by the Indian River, which enters the Ottawa at this point. The industries of the town include saw, grist and flour mills, an axe factory and a foundry. Population 1891, 4,401.

PEMBROKE, a Welsh borough. See Vol. XVIII, p. 482.

PEMMICAN, as made by the American Indians, consisted originally of buffalo-meat dried by the sun or wind, and then pounded into a paste and tightly pressed into cakes; sometimes the fruit of the juneberry (*Amelanchier ovata*) was added to improve the flavor. It could be kept for a very long time uninjured. That made for the Arctic voyagers consists chiefly of beef.

PEMPHIGUS. See SKIN DISEASES, Vol. XXII, p. 123.

PENALTY, a punishment annexed by law or judicial decision to a violation of law; usually a sum of money to be paid, as in the case of a fine. But the expression "death penalty" is also often used. The term is also used to describe a penalty provided by contract as a forfeit which an obligor agrees to pay if he shall fail to fulfill his part of the agreement. The most ordinary form of penalty is that named in a bond. In a common money bond the obligor often binds himself in absolute terms to pay the obligee a certain sum which is the "penalty"; but in a subsequent clause, called the condition, it is provided that if he shall pay another and smaller sum with interest at a specified time the entire obligation shall be void. A penalty thus inserted in a contract is a mere matter of form. Its legal effect was long established by equity; and this equitable doctrine has been fully accepted by courts of law. The party who fails to perform his agreement does not thereby forfeit the whole sum mentioned as the penalty, but is liable only for the amount of damages actually sustained by the other party, and upon payment of such damages, or the principal and interest of the debt if the instrument is a penal bond, he is discharged from all other obligation. Under certain circumstances, however, such a clause is treated as any other promise to pay and is binding according to its terms, so that the exact amount named in the contract can be recovered from the obligor. Thus, in a bail-bond, a bond conditioned upon the performance of an act and other similar bonds, the penalty is generally required to be paid in full upon a breach of the condition thereof. See also FINE, Vol. IX, p. 193.

PENANG. Same as PRINCE OF WALES ISLAND, Vol. XIX, p. 741.

PENDENTIVE. See ARCHITECTURE, Vol. II, p. 469.

PENDER, SIR JOHN, an English cable magnate; born in Dumbartonshire, Scotland, in 1816; educated at the high-school, Glasgow, where he was awarded a gold medal for drawing; entered the counting-room of a local factory, and in a few years was its general manager; accumulated a fortune in business in Glasgow, Manchester and London. When the Atlantic cable project was broached he was one of 345 who contributed \$5,000 to the experiment, with which enterprise he was thenceforward identified. He occupied in Britain the same position that Cyrus W. Field did in the United States. When cable after cable had failed and the *Great Eastern* parted with her

cable in mid-ocean, John Pender stood almost alone in Britain in his faith in the eventual success of the project. He again interested others, and aided in forming the Anglo-American Company, with a capital of \$3,000,000. He gave his personal guaranty to the Cable Construction and Maintenance Company, and the cable was laid, the old cable being recovered during the second undertaking. He developed the Mediterranean, Eastern (Indian and China), Australian, South African and direct African cables. He was a member of Parliament for Totness from 1862 to 1866, and for Wick from 1872 until his death. He received the Grand Cordon of the Order of the Medjidieh from the Sultan of Turkey; was a Knight Commander of the St. Saviour Order of Greece and of the Order of the Rose of Portugal, and a Grand Cross of the Order of St. Michael and St. George of Britain. He published *Statistics of the Trade of the United Kingdom with Foreign Countries from 1840* (1869). His eldest son, J. Pender, was elected Conservative member of Parliament for Northamptonshire, England, in 1895. Sir John died in London, July 7, 1896.

PENDER, WILLIAM DORSEY, an American soldier; born in Edgecombe County, North Carolina, Feb. 6, 1834; graduated at West Point in 1854; promoted first lieutenant in 1858; was active on the frontier until 1861, when he joined the Confederacy and was appointed colonel of the Sixth North Carolina Regiment 1861; became brigadier-general, 1862; major-general, 1863; and was killed at Gettysburg in the same year.

PENDLETON, a township of Lancashire, England, with a station on the Lancashire and Yorkshire railway. It is a suburb of Manchester, and is 2½ miles W.N.W. of the town of that name; has collieries and manufactories of cotton and silk. Population 1891, 56,926.

PENDLETON, a city and the capital of Umatilla County, northeastern Oregon (laid out in 1869), on the Umatilla River, and on the Oregon Railway and Navigation Company and the Washington and Columbia River railroads, 231 miles E. of Portland. The growth of the city has been very rapid since 1880, and the area was enlarged in 1884 by the annexation of 640 acres of the Umatilla Indian reservation. The river at this point furnishes good water-power, and is spanned by three bridges. The leading industries of the city are flour-mills, machine-shops, paper-mill and foundry. Pendleton has electric lights, good public schools, two daily and three weekly papers, and is the seat of St. Joseph's Academy (Roman Catholic) and Pendleton Academy. Population in 1880, 730; in 1890, 2,506; estimated in 1895, 3,500.

PENDLETON, EDMUND, an American lawyer and statesman, born in Caroline County, Virginia, Sept. 9, 1721. In 1752 he was elected to the house of burgesses; in 1774, a member of the first Continental Congress. In 1776 he drafted the resolution instructing the delegates of Virginia to propose in Congress a declaration of independence. During the Revolutionary War he was

chairman of the Virginia Committee of Safety. When the State of Virginia was organized he became speaker of the house. He also presided over the state convention which ratified the Federal Constitution. From 1779 till his death, Pendleton was president of the Court of Appeals. In 1789 he was named judge of the United States District Court of Virginia, but declined. A county in his state was named in his honor. He died in Richmond, Virginia, Oct. 23, 1803.

PENDLETON, GEORGE HUNT, an American public man; born in Cincinnati, Ohio, July 25, 1825. He practiced law in Cincinnati, served in the state senate 1854-55, and from 1856 until 1865 sat in Congress as a Democrat. In 1864 he was nominated for Vice-President of the United States on the Democratic ticket headed by George B. McClellan. From 1879 until March, 1885, he was United States Senator from Ohio, and in the latter year was appointed by President Cleveland minister to Germany. He died in Belgium, Nov. 24, 1889.



GEORGE H. PENDLETON.

PENDULUM. See CLOCKS, Vol. VI, pp. 14-17.

PENELOPIDÆ OR PENELOPINÆ. See GUAN, Vol. XI, p. 232.

PENINSULAR WAR. See WELLINGTON, Vol. XXIV, pp. 495, 496.

PENN, JOHN, a signer of the American Declaration of Independence; born in Caroline County, Virginia, May 17, 1741; was almost entirely self-educated; admitted to the bar in 1762; removed to Greenville County, North Carolina, in 1774; was a member of the Continental Congress, supplying a vacancy, in 1775; signed the Declaration of Independence in 1776; re-elected to the Continental Congress until 1780; in the latter year, on the invasion of North Carolina by Cornwallis, was given unlimited powers, discharging his trust with great credit; was for a short time in 1784 receiver of state taxes. He died, in retirement, September, 1788.

PENN, JOHN, an American colonial governor, descendant of William Penn; born in London, July 14, 1729; completed his education in Geneva, Switzerland; and, proceeding to America, entered the executive council in 1753, was a member of the Colonial Congress, held at Albany, 1754, returned to England, but in 1763 went back to the colony as lieutenant-governor, managed the negotiations with the Indians at Fort Stanwix, which ended their proprietary rights in the colony. He was called to England on the death of his father, and returned to Pennsylvania in 1773 as governor. In the pre-Revolutionary days he endeavored to accommodate both sides; the newly-constituted assembly ignored his authority, and the governor acquiesced. In 1777 he was arrested on the cap-

ture of Philadelphia by Howe, to prevent him from becoming a British hostage, but was released the following year. He died in Bucks County, Pennsylvania, Feb. 9, 1795, his remains being subsequently removed to England.

PENN, RICHARD, an American colonial governor, brother of the preceding; born in England in 1735; studied for a time at Cambridge; went with his brother to Pennsylvania in 1763; entered the executive council in 1764; spent two years in England; returned to the colony as lieutenant-governor in 1771; became extremely popular with the colonists; was superseded in the governorship in 1773 on the return of his brother from England. The members of the Continental Congress, among them George Washington, were entertained at his house. In 1775 he presented a petition to the King, and was examined as to its authenticity in the House of Lords, in London, Nov. 7, 1775. He was elected to the British Parliament in 1796, sitting for ten years. He visited Philadelphia two years later, and died in Richmond, England, May 27, 1811.

PENNEL, HENRY CHOLMONDELY, an English poet and author; born in 1837. He entered the public service about 1853, and after serving in various departments of the admiralty, was appointed one of the inspectors of fisheries in 1866. In January, 1875, he was selected by the English government, at the request of the Khedive of Egypt, to initiate and assist in carrying out commercial reforms in Egypt, and was afterward nominated director-general of commerce for the interior. Mr. Pennell made his first mark in literature in *Puck on Pegasus* (1861)—a book which attracted considerable notice and has since gone through many editions. His other poetical works are *Crescent*; *Modern Babylon*; *The Muses of Mayfair*; and *Pegasus Re-saddled*. During 1864-65 he edited the *Fisherman's Magazine and Review*, and contributed to the literature and practice of angling and ichthyology a number of successful works, including *The Angler-Naturalist* (1864); *The Book of the Pike* (1866); *Modern Practical Angler* (1873); *The Sporting Fish of Great Britain* (1886); *Modern Improvements in Fishing-Tackle and Fish-Hooks* (1887); etc.

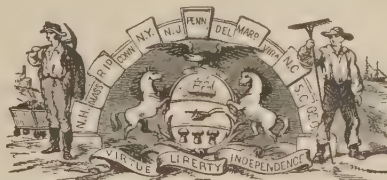
PENNEL, JOSEPH, an American etcher and illustrator, born in Philadelphia, Pennsylvania, in 1860. He and his wife, Elizabeth Robins, as a result of their travels on the continent of Europe, illustrated and wrote a series of charming works. In 1887 appeared *Two Pilgrims' Progress*, by both, in France and Italy; which was followed by *Our Sentimental Journey Through France and Italy*, covering the route taken in Sterne's *Sentimental Journey* (1888); *Pen-Drawings and Pen-Draughtsmen*, in which the author vindicated the use of the pen in illustrative work (1889); *Our*



JOSEPH PENNELL.

Journey to the Hebrides (1889); *Charing Cross to St. Paul's*, the text by Justin McCarthy and the illustrations by Joseph Pennell (1891); *The Stream of Pleasure*, by himself and wife (1891); *Play in Provence*, by both (1892); *The Jew at Home*, in southeastern Europe (1892); *To Gypsylsland*, by both (1893); *Modern Illustrations*, with examples in many different processes (1896). In 1891 he was arrested in Russian Poland while photographing scenery, being suspected of securing pictures of forts. He wrote an introduction (in which he assailed Raphael) to Dante Vierge's illustrations of Q. Villega's *Pablo de Segovia* (1892); and in 1894 an exhibition of his drawings was made at Kappel's gallery in New York.

PENNSYLVANIA had a population in 1890 of 5,258,014, that of 1880 having been 4,282,891.



STATE SEAL OF PENNSYLVANIA.

The gain for the ten years amounted to 22.77 per cent, almost identical with the increase between 1870 and 1880, which was 21.61 per cent. In 1890 the density of population to the square mile was 116.88, an increase from 95.21 in 1880. The eleventh census report placed 44 of the cities of Pennsylvania in the list of places having a population of 8,000 or more, in which resided 2,152,051 of the people of the state, constituting 40.93 per cent of the entire number of inhabitants. The number of males was 2,666,331; of females, 2,591,683; the per centage of native-born population was 83.92; the number of negroes was 107,596, an increase of 22,061 within the ten years preceding; the Chinese numbered 1,146, the Japanese 32, and the civilized Indians 983.

The latest surveys of the state show the gross area to be 45,215 square miles, of which 230 square miles are water surface.

The census reports of 1890 show Pennsylvania standing high among the states in the area devoted to the cereals and in production. Of the entire acreage under the six crops classed as cereals, 28.15 per cent was under corn, 29.64 under wheat, 29.45 under oats, 0.47 under barley, 7.56 under rye, and 4.73 under buckwheat.

This table shows the area devoted to each crop:

ITEM.	ACRES.	RANK.	BUSHEL.	RANK.
All cereals-----	4,448,517	10	107,416,961	10
Corn-----	1,252,369	18	42,318,279	11
Wheat-----	1,318,472	11	21,595,499	10
Oats-----	1,310,197	9	36,197,409	11
Barley-----	20,950	14	493,893	14
Rye-----	336,041	1	3,742,194	2
Buckwheat-----	210,488	2	3,069,717	2

Stock-raising has long been an important branch of agriculture in Pennsylvania. The number of colts foaled in 1889 was 59,532. In

1890 the mules in the state numbered 29,235, constituting 68.09 per cent of the entire number in the North Atlantic division. More than one-half of the swine on farms at the time of the enumeration were slaughtered for home use. The work-oxen on farms were materially increased between 1880 and 1890, and the gain in the number of milch cows during the same period amounted to 73,098. Other cattle on farms were decreased in the same time by 99,219. Pennsylvania stood ninth in the average value of flax products per acre, but 16th among the 28 states reporting a production of either fiber or seed or both. The standing in the area devoted to tobacco was that of 6th, the acreage being 26,955; the production of 28,955,247 pounds giving the same position, that of 6th. The leading tobacco-producing county of the entire United States was Lancaster County, Pennsylvania, which in 1889 yielded 19,217,800 pounds.

Every state of the nine composing the North Atlantic division suffered a loss of number of farms during the decade 1880 to 1890. In Pennsylvania this decrease was almost two thousand, while the loss of the group exceeded 37,000.

The following table gives the relative sizes of the farms of Pennsylvania in 1890, as well as information in regard to the tenure under which they were held:

Total number of farms-----	211,557
Under 10 acres-----	13,172
10 and under 20 acres-----	16,761
20 and under 50 acres-----	39,244
50 and under 100 acres-----	66,743
100 and under 500 acres-----	74,880
500 and under 1,000 acres-----	606
1,000 acres and over-----	151
Cultivated by owners-----	162,219
Rented for fixed money value-----	18,040
Rented for share of products-----	31,298

At each decennial census since the eighth, Pennsylvania has held the rank of second among the states in the gross value of manufactured products, net value of the same, average number of employees, and the total wages paid. The census of 1890 gave the number of establishments at 39,339, the aggregate capital invested \$991,243,115, the number of employees 620,562, the cost of material \$773,734,637, and the value of the finished products \$1,331,794,901. The following table gives the products whose value was above twenty millions:

INDUSTRY.	NUMBER.	CAPITAL.	WORKERS.	WAGES.	PRODUCT.
Carpentering-----	1,389	\$ 10,610,190	12,727	\$ 8,699,085	\$ 26,592,306
Carpets and rugs-----	142	15,129,619	12,674	5,509,805	22,886,416
Car and shop construction-----	61	17,475,056	22,995	12,532,778	28,769,728
Clothing, men's, factory-----	337	15,609,046	8,662	4,165,904	26,732,348
Flouring and grist-mill products-----	2,226	21,079,642	5,149	2,102,181	39,478,076
Foundry and machine-shop products-----	886	69,121,468	40,635	24,058,082	67,587,025
Iron and steel-----	280	211,483,285	86,437	48,675,495	248,809,071
Iron and steel pipe-----	14	18,849,616	9,431	4,634,666	30,249,795
Leather, tanned and curried-----	376	25,111,007	8,543	4,097,524	39,011,518
Lumber and timber-----	2,415	59,201,395	29,186	10,884,481	48,801,894
Sugar and molasses refining-----	10	7,113,245	1,524	753,574	46,599,754
Woolen goods-----	264	21,671,137	16,061	5,729,982	29,878,070

The following comparative statistics are from the census report of 1890:

ITEM.	1880.	1890.
Total number of farms-----	213,542	211,557
Average size of farms, acres-----	93	87
Total acres in farms-----	19,791,341	18,364,370
Improved acres in farms-----	13,423,007	13,210,597
Unimproved acres in farms-----	6,368,334	5,153,773
Valuation of land, fences, buildings, implements and machinery and live-stock-----	\$ 1,095,405,324	\$ 1,062,939,846
Estimated value of farm products-----	\$ 129,760,476	\$ 121,328,348
Number of horses-----	533,587	618,660
Number of mules and asses-----	22,914	29,563
Total number of neat cattle-----	1,730,237	1,706,418
Total number of swine-----	1,187,968	1,278,029
Total number of sheep-----	1,776,598	1,612,107
Pounds of wool sheared-----	8,470,273	6,441,164
Pounds of maple-sugar-----	2,866,010	1,051,163
Pounds of cane-sugar-----	2,523,600	3,219,620
Gallons of cane-molasses-----	2,734,596	5,051,553
Acres of meadow-land mown for hay-----	2,714,909	3,323,689
Tons of hay produced-----	2,811,517	4,331,582
Acres under tobacco-----	27,566	26,955
Pounds of tobacco raised-----	36,943,272	28,956,247
Acres under Irish potatoes-----	183,079	191,992
Bushels of Irish potatoes raised-----	16,284,819	12,899,315

In addition to the above, the manufacture of tobacco in its different forms aggregated \$23,000,000, printing of various kinds \$33,000,000, and twenty industries turned out products of a value in excess of ten million and under twenty million dollars.

Pennsylvania stands at the head of all of the states in the value of mineral products, the census reports giving the production of 1889 at \$150,876,649. The next three states in order of production, Michigan, Colorado and Montana, do not reach this amount with the combined value of their mineral products, which aggregate but \$145,744,909. This value of mineral products embraces only raw material, manufactured articles not included. None of the precious metals are mined, the chief products being iron and its products, coal, petroleum, natural gas, and stone. The number of coal mines reported was 3,474, the number of tons produced 36,174,089 and the value of the same \$27,953,315. The coal-fields of Pennsylvania are divided for state supervisory purposes into eight anthracite districts, embracing some ten different counties, and ten bituminous districts, which cover about thirty counties. The following table shows the production of coal and coke, and facts connected therewith:

ITEM.	1893.	1894.	1895.
Tons of anthracite-----	47,179,563	45,506,179	50,847,104
Employees, anthracite region -----	138,021	139,695	143,605
Tons of bituminous----	43,421,898	39,800,210	51,813,112
Employees, bituminous region -----	81,800	86,177	84,904
Tons of coke-----	5,549,296	5,729,244	8,922,329

Of the anthracite-producing counties, Luzerne heads the list with 19,143,101 tons; in bituminous, Westmoreland leads with 10,325,245 tons. Among the employees of the coal-mines in 1895 there were 155 fatal accidents and 419 non-fatal. More than one hundred of the fatal accidents were caused by the falling of coal, roof, rock and slate. The ratio of fatal accidents to the number of workmen was 1 to each 544, and of non-fatal accidents 1 to every 202. The amount invested in iron-ore mining in 1889 was \$16,249,313; the number of employees, 4,410; the total wages paid amounted to \$1,141,239, all expenditures to \$1,711,129, and the value of the output of the mines, \$3,063,534. As to the value of the manufactured products of iron ore, see the table of manufactures, in this article. In the matter of petroleum the statistics of Pennsylvania are combined with those of New York in the census of 1890. The amount produced was 21,487,435 barrels of the crude oil, of the value of \$23,475,163, as against \$26,963,340, the total value of the product of the United States for the year. Of illuminating oil 21,393,159 barrels were produced, of the value of \$23,225,453, as against \$24,569,190, the value of the product made in the United States during the year. Lubricating and fuel oil combined yielded a return of about \$2,395,000. Of the \$11,044,858 worth of natural gas consumed during the year mentioned, through the states, Pennsylvania furnished the same to the amount of \$8,287,383. The investment in the business represented a capital of \$34,398,832, and of the total wages paid in all sections producing gas, amounting to \$1,736,389, Pennsylvania paid \$1,092,709. First in the production of stone of all kinds, Pennsylvania reported 776 quarries and a total output of \$7,319,199. The products included granite, slate, limestone, sandstone, blue-stone, millstones, graphite, soapstone, ocher and metallic paint.

The value of the fisheries of Pennsylvania in 1889 was \$903,095; 2,631 persons were employed, as against 552 ten years previous, and 154 vessels and 1,046 boats were used in prosecuting the industry. The main branch of business was that of the oyster fishery, which produced about one half of the entire receipts. From 1890 a great interest came to be taken in the matter of inland fisheries, and large amounts of money were expended in stocking the waters of the state with the kinds of fish best adapted to the localities. Strict legal protection was thrown around the millions of young fish placed in the streams and lakes, and the benefits to the people became very

apparent by 1895, when almost every portion of the state had fish in abundance.

The real estate of Pennsylvania was assessed for taxation in 1894 at \$2,389,252,278. In 1895



THE CAPITOL BUILDING, HARRISBURG.

the revenue commissioners fixed the value of the personal property of the state at \$620,048,969. This would make the total assessable real and personal property amount to the sum of \$3,009,301,247. The state receipts for the year ending Nov. 30, 1895, were \$12,030,030, the balance on hand at the beginning of the fiscal year \$5,081,325, making the total amount in the treasury during the year \$17,111,355. Among the chief sources of revenue were tax on capital stock, amounting to \$3,537,840; tax on personal property, \$2,307,936; tax on collateral inheritances, \$1,091,993; tax on corporation loans, \$822,381; tax on gross receipts of corporations, \$598,548; tax on bank stocks, \$514,074; tax on foreign insurance companies, \$513,616; mercantile licenses, \$532,294; wholesale liquor licenses, \$446,136; bonus on charters, \$241,789; fees of public officers, \$172,642. The payments for the year amounted to \$13,681,701, leaving the balance on hand Dec. 1, 1895, \$3,429,654. The public debt amounted at the time mentioned to the sum of \$6,816,309, but the assets of the sinking-fund were sufficient to have reduced this amount to \$1,838,507. The biennial appropriations for 1895 and 1896 amounted to \$11,999,944 for the former year and \$10,948,812 for the latter.

The following table shows the purposes for which the different appropriations were made, for the years mentioned, and the amount of the same:

	1896.	1895.
Educational -----	\$ 6,879,081	\$ 6,911,015
Charitable institutions -----	827,400	871,373
Care and treatment of indigent insane and for buildings -----	559,500	667,181
Penitentiaries and reformatories -----	322,127	367,127
Departments -----	537,450	558,041
Judiciary -----	667,300	667,300
Legislature -----	15,370	601,871
Interest on public debt -----	269,371	269,371
Public printing and binding -----	215,645	256,711
National Guard -----	350,000	350,000
Miscellaneous -----	305,568	449,953
Totals -----	\$10,948,812	\$11,999,944

The following table shows statistics regarding the state charitable, correctional and penal institutions of Pennsylvania:

INSTITUTIONS.	MAINTENANCE.	INMATES.
<i>Hospitals for Insane.</i>		
State Hospital, Harrisburg-----	\$100,437	845
State Hospital, Danville-----	75,454	1,014
State Hospital, Norristown-----	164,240	1,813
State Hospital, Warren-----	76,277	908
Insane Hospital, Dixmont-----	48,101	743
Friends Asylum, Philadelphia-----	---- (a)	130
Pennsylvania Hospital, Philadelphia-----	---- (a)	418
State Asylum, Wernersville-----	128,251	764
<i>Deaf and Dumb Institutions.</i>		
Pennsylvania Institution, Phila.-----	138,339	502
W. Penn'a Institution, Allegheny Co.-	42,631	195
Home for Young Deaf Children, Bal-	19,576	43
Pennsylvania Oral School, Scranton-	29,928	60
<i>Blind Asylums.</i>		
Pennsylvania Institution, Phila.-----	27,868	185
W. Penn'a Institution, Pittsburg-----	14,694	77
Institution for Feeble-Minded Chil-		
dren, Elwyn-----	96,250	982
State Penitentiary, Philadelphia-----	50,003	1,380
State Penitentiary, Allegheny-----	121,530	1,151
Indust'l Reformatory, Huntingdon-----	130,757	489
House of Refuge, Philadelphia-----	63,750	410
Reform School, Morganza-----	43,393	304

In addition to the foregoing, the state extended partial support to 103 hospitals, asylums, homes, societies and missions. The total expenditures for 1895 for charitable, correctional and penal institutions by the state was considerably in excess of \$2,000,000. This amount did not include any part of the sums expended by counties for the care of paupers and prison expenses.

In 1895 there were operated within Pennsylvania 9,761 miles of railroad, an increase of about 350 miles over 1894, and 660 miles more than in 1893; the number of employees was given as 193,161, their total yearly compensation \$102,959,434. Up to 1896 the actual cost of road and equipment of the different lines aggregated \$1,579,857,035, and the total amount of funded debt and current liabilities aggregated \$1,086,192,221. The report of all earnings and income showed the amount to be \$277,454,035, the operating expenses and other expenditures reaching the sum of \$250,094,248. In the report of the secretary of internal affairs is also included a statement relative to the street-railways of the state, the number of which in 1895 was 489, as compared with 60 lines in 1888. The canals of the state reported a mileage of 601, the cost of construction and fixtures amounting to \$31,454,892. Almost one thousand boats ply the waters of the canals of the state, which carried in 1895 2,056,232 tons of freight, received the sum of \$2,321,344, and expended for maintenance and operation \$787,649. The different lines of telegraph and telephone in Pennsylvania reported a total of 13,643,704 messages sent during 1895, for which service they had received the sum of \$2,238,684, and met gross expenses to the amount of \$1,103,562.

But once during a period of fifty years has the legislature of Pennsylvania appropriated for the maintenance of the public schools a less sum than

the amount appropriated by the preceding legislature. From the sum of \$200,000 to \$5,500,000 the appropriation has gradually kept pace with the demands of increase in population and educational methods. In addition to the \$5,500,000 appropriated to the public schools for the year ending June 3, 1895, the legislature also aided the state college to the amount of \$212,000, the post-graduate department of the University of Pennsylvania \$200,000, and gave \$50,000 to aid in establishing a school of mining in connection with the Western University. The following report of the public schools of Pennsylvania for the fiscal year above mentioned also includes the schools of the city of Philadelphia: Number of school districts in the state, 2,444, an increase of 31 within the year; number of schools, 25,348, an increase of 807; number of graded schools, 13,900, an increase of 1,041; number of male teachers, 8,628; number of female teachers, 17,460—an increase of 164 males and a decrease of 317 females; average salary of male teachers per month, \$44.52, an increase of \$0.36; average salary of female teachers, \$38.34, an increase of \$5.29; average length of school term in months, 7.91, a very slight decrease. The total number of pupils was 1,070,612, an increase of 29,933; the average number of pupils was 779,463. The cost of schoolhouses, purchasing, building, renting, etc., for the year, amounted to \$3,724,558. The item of teachers' wages reached \$9,304,329; cost of school text-books was almost \$1,000,000; fuel, contingencies, etc., amounted to near \$5,000,000, and the total expenditures footed \$18,992,651. The estimated value of the school property of the state was \$46,617,109. In 1895 the legislature passed a bill providing for compulsory education, by the terms of which all children within the state between the ages of eight and thirteen years were compelled to attend school, the minimum limit being twelve weeks, of which six weeks must be consecutive. To provide for the enforcement of this law, districts were to be deprived of a pro rata amount of the school revenue for each child not attending in accordance with law. In the 13 districts of the state in which normal schools are maintained, the legislature appropriated \$118,467. Since the organization of these schools the state has, by direct legislative appropriation, donated to the 13 the aggregate sum of \$2,534,991. Among the institutions of higher education in Pennsylvania were 5 universities, 32 colleges, 14 seminaries, 16 academies, 8 institutes, 20 schools and 3 homes, in which 1,293 instructors were employed, and which had a total enrollment of 19,855. The whole number of students in these institutions since their foundation amounted to 157,439, but in this report many did not join. At the last commencement exercises of the several institutions the number of female graduates was 732; the number of male graduates, 1,499.

The following is a list of the denominational educational institutions of Pennsylvania, their location, and the church organization under whose auspices they were managed (1896):

LOCATION.	INSTITUTIONS.	RELIGIOUS DENOMINATION.
Allentown.....	Muhlenberg College...	Lutheran.
Annville.....	Lebanon Valley Coll..	U. Brethren.
Beatty.....	St. Vincent College....	Roman Cath.
Beaver Falls.....	Geneva College.....	Ref. Pres.
Bethlehem.....	Moravian College.....	U. Brethren.
Carlisle.....	Dickinson College....	Meth. Epis.
Collegeville.....	Ursinus College.....	Reformed.
Easton.....	Lafayette College.....	Presbyterian.
Gettysburg.....	Pennsylvania College..	Lutheran.
Greenville.....	Thiel College.....	Lutheran.
Haverford.....	Haverford College....	Friends.
Jefferson.....	Monongahela College..	Baptist.
Lancaster.....	Franklin and Marshall College.....	Reformed.
Lewisburg.....	Bucknell University...	Baptist.
Lincoln Univers'y.	Lincoln University....	Presbyterian.
Meadville.....	Allegheny College....	Meth. Epis.
New Berlin.....	Central Pennsylvania College.....	Evan. Ass'n.
New Wilmington..	Westminster College..	United Pres.
Philadelphia.....	La Salle College.....	Roman Cath.
Pittsburg.....	Holy Ghost College....	Roman Cath.
Swathmore.....	Swathmore College....	Friends.
Villanova.....	Villanova College....	Roman Cath.
Washington.....	Washington and Jefferson College.....	Presbyterian.

The following is a list of the nonsectarian institutions of the state:

LOCATION.	INSTITUTIONS.
Allegheny.....	Western University of Pennsylvania.
Chester.....	Pennsylvania Military College.
Grove City.....	Grove City College.
Philadelphia.....	Central High School.
Philadelphia.....	University of Pennsylvania.
Pittsburg.....	Duquesne College.
Volant.....	Volant College.

The following are the educational institutions for women in Pennsylvania, their location, and the auspices under which they are controlled:

LOCATION.	INSTITUTIONS.	MANAGEMENT.
Allentown.....	Allentown College for Women.....	Reformed.
Bethlehem.....	Moravian Seminary for Young Ladies.....	Moravian.
Carlisle.....	Metzger College.....	Non-sect.
Chambersburg..	Wilson College.....	Presbyterian.
Lititz.....	Linden Hall Seminary..	Moravian.
Mechanicsburg.	Irving College for Young Women.....	Lutheran.
Ogontz School...	Ogontz School.....	Non-sect.
Pittsburg.....	Penn'a Coll. for Women.	Presbyterian.
Pittsburg.....	Pittsburg Female Coll..	Meth. Epis.

In 1890 there were 10,175 church organizations in Pennsylvania, 9,624 edifices, a membership of 1,726,640, which constituted 32.84 per cent of the entire population, and church property of the value of \$85,917,370. In the number of organizations and edifices Pennsylvania ranks first among the states and is second in the number of communicants and the value of church property. Fifty-two denominations and 17 independent congregations were enumerated. All Baptist bodies numbered 720; the Roman Catholics, 654; the Church of God, 162; Congregationalists, 108;

Disciples of Christ, 125; Dunkards, 134; Evangelical Association, 662; Friends, 108; Lutherans, all bodies, 1,292; Methodists, all bodies, 2,536; Presbyterians, 1,365; Protestant Episcopal, 382; Reformed, 762; and United Brethren, 526.

Pennsylvania stands first among the states in the number of church organizations, first in the number of edifices and first in the approximate seating capacity of the church buildings. In the value of church property Pennsylvania stands second only to New York and occupies the same relative position as to the number of communicants or members.

The National Guard of Pennsylvania, according to the report of the adjutant-general of the state made at the close of 1895, numbered 8,934 officers and enlisted men. The force consisted of 1 division, divided into 3 brigades, and comprising 140 companies divided into 15 regiments of infantry (3 of 10 companies and 12 of 8 companies each), 1 battalion of infantry of 4 companies, 1 independent company of infantry, 3 batteries of artillery, 3 troops of cavalry and 3 divisions of naval militia (each division being equivalent to a company of infantry.) The expenditures made in 1895 on state account amounted to \$339,719, to which the United States added \$41,533, mainly in equipments and accoutrements.

Jan. 1, 1896, there were 1,446 newspapers published in Pennsylvania, of which 197 were daily, 4 triweekly, 29 semiweekly, 972 weekly, 10 fortnightly, 14 semimonthly, 2 three times a month, 196 monthly, 7 bimonthly and 15 quarterly. Papers were published in all of the 67 counties and in 438 of the cities, towns and villages, of which 67 were county seats.

Of the date of Nov. 12, 1895, the commissioner of banking reported as follows:

INSTITUTION.	NO.	CAPITAL.	RESERVE.	DEPOSITS.
Banks.....	83	\$ 8,415,050	\$ 8,442,384	\$ 41,915,517
Sav'gs instit's	16	111,200	6,375,362	73,937,636
Trust Co's...	88	39,976,236	20,450,665	103,114,827
Total.....	187	\$48,502,486	\$35,268,411	\$218,967,980

The following is a list of the principal cities and towns of Pennsylvania, with the population as given in the census reports of 1890: Philadelphia, 1,046,964; Pittsburg, 238,617; Allegheny, 105,287; Scranton, 75,215; Reading, 58,661; Erie, 40,634; Harrisburg, 39,385; Wilkesbarre, 37,718; Lancaster, 32,011; Altoona, 30,337; Williamsport, 27,132; Allentown, 25,228; Johnstown, 21,805; York, 20,739; McKeesport, 20,471; Chester, 20,226; Norristown, 19,791; Shenandoah, 15,944; Lebanon, 14,664; Easton, 14,481; Shamokin, 14,403; Pottsville, 14,117; Pottstown, 13,285; Hazleton, 11,872; New Castle, 11,600; Mahanoy City, 11,286.

The following is a list of the governors of Pennsylvania, with their respective terms of office: Thomas Mifflin, 1788-99; Thomas McKean, 1799-1808; Simon Snyder, 1808-17; William Findley, 1817-20; Joseph Heister, 1820-23; J. Andrew Schulze, 1823-29; George Wolf, 1820-

37; Joseph Ritner, 1837-39; David R. Porter, 1839-45; Francis R. Shunk, 1845-49; William F. Johnston, 1849-52; William Bigler, 1852-55; James Pollock, 1855-58; William F. Packer, 1858-61; Andrew G. Curtin, 1861-67; John W. Geary, 1867-73; John F. Hartranft, 1873-79; Henry M. Hoyt 1879-83; Robert E. Pattison, 1883-87; James A. Beaver, 1887-91; Robert E. Pattison, 1891-95; Daniel H. Hastings, 1895-.

See PENNSYLVANIA, Vol. XVIII, pp. 498-504.

PENNSYLVANIA, UNIVERSITY OF. This institution owes its existence to the efforts of Ben-



COLLEGE HALL, UNIVERSITY OF PENNSYLVANIA.

jamin Franklin, who organized a board of trustees in 1749, and who, after obtaining \$2,000 by subscriptions, was elected a trustee of a building in Philadelphia, on Fourth Street, near Arch. Instruction began in 1751, and in 1753 the institution was incorporated as "The Trustees of the Academy and Charitable School in the Province of Pennsylvania." Under a second charter, obtained in 1755, under the style of "The College and Academy of Philadelphia," the first class was graduated in 1757. In 1762 William Smith, the provost of the college, added £6,000 to the endowment, which sum he obtained in England. With this and an added sum, obtained by means of a lottery, another building was especially prepared for the accommodation of students from the West Indies. The medical school was opened in 1765. Upon the outbreak of the Revolution Dr. Smith, who was regarded as a friend to Great Britain, was imprisoned; but he continued to hear recitations from his cell. The charter of the college was revoked by the legislature in 1779, and its franchises were conferred upon a new organization, "The University of the State of Pennsylvania"; but ten years later the old faculty and trustees of the College of Philadelphia were reinstated, and in 1791 the sundered interests of the two corporations were compromised by their uniting under the style of the "University of Pennsylvania."

In 1828 the university acquired title to the property where now stands the Philadelphia post-office, and added two new buildings for departments in law, medicine and the arts, where its work was carried on until 1872, when the institution entered on a new career. In 1896 the uni-

versity plant embraced nearly fifty acres of land, together with a half-dozen buildings, the main structure, a beautiful half-Gothic, having a frontage of 260 feet and overlooking the Schuylkill River; also a library building containing 125,000 volumes and a fine collection of antique and historical engraved gems gathered by Maxwell Sommerville, professor of glyptography, and valued at \$200,000; also a medical hall, a hospital, a laboratory building, a veterinary college and a biological hall. The entire plant was valued at \$3,500,000 and its total productive fund at \$5,000,000. It had an annual revenue of \$350,000; about two hundred and fifty instructors and 2,500 students. An expedition to Babylonia, sent out by this university in 1889, discovered (1895-96) the ancient city of Nippur, which is alleged to ante-date Babylon by thousands of years. See NIPPUR, in these Supplements.

PENNSYLVANIA COLLEGE, situated at Gettysburg, Pennsylvania, founded in 1832, under



RECITATION HALL, PENNSYLVANIA COLLEGE.

Lutheran auspices. The institution was inaugurated without endowment, but in 1834 the state appropriated \$18,000 to its support, besides furnishing for a number of years an annual grant of \$1,000; while, by an act of the legislature in 1850, one third of the value of the funds of Franklin College, at Lancaster, was transferred to Pennsylvania College, to enable the college to found a Franklin professorship. The campus, extending to 35 acres, is covered by a handsome recitation-hall (containing lecture-rooms, library and museum), dormitory, chapel, gymnasium, chemical laboratory, an astronomical observatory, society-halls, preparatory-halls, and residences. There are courses in classics, modern languages and literature, the English Bible, natural sciences, hygiene and physical culture. There were 16 professors and 217 students in 1895. The library contains 22,000 volumes. The productive funds amount to \$210,000 and the total yearly income in 1895 to \$16,000.

PENNSYLVANIA DUTCH, a name in common use for the descendants of the German religious sects that settled in Pennsylvania early in the eighteenth century, chiefly between the Susquehanna and

Schuylkill rivers. They form the body of the Dunkers, of the various branches of the Mennonites, and of kindred exclusive sects. Their professed withdrawal from the world has led to their living in secluded communities, and even where they are mingled parts of a diversified and American population they go in and out with little attention to general interests. They maintain their modes of distinctive dress; they intermarry among themselves; they are wealthy, for an agricultural community; their farms are in superb tilth, and are notable for their great barns standing picturesquely on the summit of some gentle slope, and for their tiny, plain brick houses. Among them are many persons who do not understand English at all, and who communicate with each other only in the tongue called "Pennsylvania Dutch." The original immigrants came from the Palatinate, Bavaria, German Switzerland, and even from Alsace. They spoke the provincial German characteristic of those localities, and the speech of their descendants has arisen from the mingling of those related dialects, influenced in some measure by the incorporation of useful English words and the natural modifications that take place in oral language. This speech has been investigated by S. S. Haldeman and Henry Harbaugh, whose publications have made its study practicable for the curious. It seems to be related to the Pfälzisch, and preserves many old German words used by the peasantry in the home countries, interspersed more or less, according to locality, with Germanized English words. In parts of Pennsylvania are newspapers printed in this tongue. To give some idea of it, the following four lines from a poem by Dr. H. Harbaugh are given, together with the corresponding German:

"Ich seh sei rothe fligle plehn,
Wann er di feddere wescht:
Will wette, das de fraale hot
Uf sellem baum 'n nescht!"

The high German for the same is the following, with the exception of the last word of the first line, which is a re-spelt English word unaltered in pronunciation:

Ich sehe seine rothen Flügel PLAIN,
Wenn er die Federn wäscht:
Will wetten dass das Fräulein hat
Auf demselben Baum ein Nest!

A literal translation in English is as follows:

I see his red wings plainly,
When he washes his feathers:
(I) will wager that the female has
In the self-same tree a nest!

PENNSYLVANIA STATE COLLEGE, located at State College, Centre County, was organized in 1859 as the Farmers' High School, its name being changed in 1862 to the Agricultural College of Pennsylvania. The legislature having appropriated to the college the income from the proceeds of the national land-grant and its scope having been enlarged, its name was in 1874 again changed to the Pennsylvania State College. It is especially an industrial school, giving particular attention to practical and scientific agriculture, while it also provides instruction in mathematical, natural and physical sciences. The agricultural experimental station, in

connection with the college, receives from the United States government an appropriation of \$15,000 yearly. The state holds the proceeds of the national land-grant in trust, for which it has given its bond for \$500,000, on which it pays interest to the college at the rate of six per cent per annum. Congress in 1890 passed a law appropriating to agricultural colleges \$15,000 a year, to be increased annually \$1,000 until it reaches \$25,000. These appropriations have enabled the institution to be well equipped in buildings, laboratories, libraries, museums, etc. It is under the control of a state board of 9 *ex officio* and 15 elected members. There is an elementary course in mechanic arts. The number of professors and instructors is 43, and the number of students averages about three hundred.

PENNY, a coin. The precise etymology of the word is obscure. The early Anglo-Saxon form was *penning* or *penig*, and the Icelandic form *penningr* ("cattle" "money") may, presumably, have been derived from the same source; while the German form, *pfennig*, is perhaps only another variation of the same word, which may have had its birth in a common locality; but whence came the word itself, or what it originally meant, cannot be told. The earliest English, as well as the Continental use of the word *penny*, was as an equivalent of the Roman *denarius*, which had some circulation in northern Europe in the early centuries. Charlemagne, who formulated a medium of exchange for the Franks in the latter part of the eighth century, retained the Roman division of the *libra* (or pound of silver) into twenty *solidi*, and the *solidus* into twelve *denarii*, making the *denarius* or penny $\frac{1}{12}$ part of a pound-weight of silver. From this usage the entire coinage system of modern Europe has been derived. The application of the word which reaches farthest into the past is the modern English translation of Matthew xx: 2; but the *penny* here referred to was the *denarius*, which was coined by the Romans into both a silver and a large copper piece, and used in the latter shape in Judea. In the English currency the penny was originally a silver coin, and the only one current before the Norman Conquest. The first copper pennies (the twelfth part of the shilling) were struck in 1797, although copper half-pennies and farthings had been in use since 1672. In 1860 the metal was changed from copper to bronze, which form still remains, and consists of 95 parts copper, 4 of tin and 1 of zinc. Its weight is 145.833 grains troy. The letter "d," used as the sign of the penny, is from the Roman *denarius*. The name has also (although improperly) been applied to the United States *cent*.

PENN YAN, a village and the capital of Yates County, western central New York, on the northern end of Keuka Lake, 53 miles S.E. of Rochester, and on the Fall Brook and the Northern Central railroads. It has steamboat connection with Hammondsport at the south end of the lake; is the center of the largest grape-growing region in the United States east of California; derives good water-power from the outlet of the lake; has foundries, and manufacturing of flour, carriages and threshing-machines,

and is the seat of an academy. Population 1890, 4,254.

PENNYROYAL. For the English herb, see *MINT*, Vol. XVI, p. 492.

PENOBSCOT BAY AND RIVER, the name of a bay and river in Maine. Penobscot Bay is an inlet of the Atlantic on the south coast of Maine, extending northward for a distance of thirty miles, between the counties of Knox and Waldo on the west and Hancock on the east. It has a width at its entrance of about twenty miles; is known in its northern part as Belfast Bay; has deep waters, inclosing several islands and affording good harbors. The bay at its northern end receives the Penobscot River, the largest river in the state and probably the most important navigable stream in New England. After rising near the Canadian frontier, in Somerset County, it flows southeast into Piscataquis County, where it expands into Chesuncook Lake, thence southeast into Penobscot County, where it is joined by the Seboois River, sometimes called the West Branch of the Penobscot, and 12 miles further meets the Mattawampeag, where it begins a southwesterly course, forming the boundary between the counties of Hancock and Waldo, and flows into Penobscot Bay. The river has a total length of about three hundred miles, and is navigable for large vessels sixty miles, to Bangor, where there is a tide of 17 feet. Other important towns on the Penobscot are Belfast, Castine and Bucksport. The river furnishes good water-power, and upon it vast numbers of logs are floated from the great pine forests of northern Maine.

PENOBSCOTS, a tribe of Indians of the Algonquin family, living on an island in Maine, near the mouth of the Penobscot River. They, with the Passamaquoddies, are members of the Abnaki branch of the Algonquians. For their services in the Revolution they received a large grant of land on the banks of the Penobscot, which they have mostly disposed of. The state controls a fund of fifty thousand dollars for their benefit. They number each about five hundred, and are Roman Catholics. These two tribes were originally called Malecites and Etechemins by the French settlers.

PENSACOLA, a city, port of entry and capital of Escambia County, extreme northwestern Florida, on Pensacola Bay, an inlet of the Gulf of Mexico, extending inland in a northeasterly direction about 35 miles, affording a deep and commodious harbor. Its entrance, about a mile wide, is defended by Forts McRae and Pickens. The city of Pensacola in 1890 had two railroads, the Alabama, Pensacola and Perdido and the Louisville and Nashville, and daily steamers running to Havana and New Orleans. The harbor is the finest on the Gulf of Mexico, and is the seat of a large commerce. During the year ending June 30, 1889, 622 vessels entered the port; and the exports for the same period were valued at \$3,748,154; imports, \$37,705. The principal shipments are of coal, fish, hides, tallow, wool, cotton, lumber and naval stores. Pensacola has gas and electric lights, water-works, street-railways, public parks, good school system, churches, banks, a number of fine buildings, including the United States govern-

ment building, opera-house, courthouse, and state armory, and two daily and two weekly newspapers. Owing to its situation in a district liable to visitation from yellow fever, the sanitary and quarantine regulations of the port are most rigid. The assessed valuation of property in the city in 1893 was \$2,303,400. Population 1890, 11,750. See also *PENSACOLA*, Vol. XVIII, p. 504.

PENSIONS, UNITED STATES SYSTEM. A pension is a reward or allowance consisting of a periodical payment of a specified sum of money, granted by the government to a person retired from service, or to his widow and children, in consideration of his past services for the country. In the United States, pensions are paid to retired soldiers and sailors who have been wounded or disabled in the performance of their duty, and to their widows and dependent children.

The pension system of England, whereby allowances are paid to those who have been engaged for a long time in the service of the government in time of peace, whether as soldier or in a political capacity, and without regard to whether they have been injured or disabled, has never prevailed in the United States, though Congress may, and frequently does, grant special allowances in such cases, when one who has devoted his life to his country's service is left in indigent circumstances in his old age. In the United States, however, when a commissioned officer of the army has completed 40 years of service, and when he has reached the age of 65, and when a non-commissioned officer or private has completed 30 years of service, such persons may, upon application to the President, be placed upon the retired list with the rank held at the time retired, and for the remainder of life receive three fourths full pay.

Widows and children of deceased members of the life-saving service are entitled to receive pensions.

Except as above specified, pensions are not granted by the United States, except to soldiers and sailors who have received injury in the service, by wounds, sickness or otherwise, or who have since become mentally or physically disabled, or to those who served in the War of 1812 or the Mexican War, and to widows, children and dependent parents of deceased soldiers.

The system of pensions for disabled soldiers and sailors began by act of Congress of Aug. 26, 1776, which provided that every officer and private engaged in the Revolution, who should be rendered incapable of earning a livelihood by means of such service, should receive one-half pay during life, or the continuance of such disability. Pension laws have continually remained in operation since that time, but subject to such changes as the conditions required.

The substance of the pension laws in force at the present time are presented below.

The widow of a private, whose deceased husband's death resulted from injuries or disease which, under the existing laws, would entitle him to an invalid pension had he been disabled, receives \$12 per month, and \$2 additional for each child of the soldier under 16 years of age, to be paid to the widow dur-

ing her widowhood, and thereafter to his child or children until they reach the age of 16 years, or in case no widow or children under the age of 16 years, then the parents of such deceased soldier shall be entitled to \$12 per month, if in dependent circumstances, during the continuance of such dependency.

Widows and dependent parents of commissioned officers received the "total of rank."

The act of June 27, 1890, commonly known as the Dependent Pension Act, provides that all persons who served for ninety days in the military or naval service of the United States during the War of the Rebellion, and who have been honorably discharged, and who were then or who might thereafter become unable to earn a support, through physical or mental disability not caused by vicious habits, whether such disability is the result of injury or disease brought about by such service or not, shall be entitled to be placed upon the list of invalid pensioners, and receive from \$6 to \$12 per month, according to the degree of their inability to earn a support.

This pension is to all ranks alike, and any one already receiving a pension may take advantage of this act to increase his pension, but shall not receive it in addition to that already allowed. The pension then allowed must be relinquished if this is claimed. This act also extends the right to receive a pension of \$8 per month to the widow of any soldier who has served as above provided, and \$2 per month, in addition, for each child under 16 years of age, without proving that the husband's death was the result of army service, such pension to be paid if such widow has no other means of support than her daily labor, and continues during her widowhood, and in case of her death or remarriage, such pension shall be paid to any child or children under 16 years of age. In case any child is insane or helpless, the pension shall continue to such child during such disability, or the life of the child.

The provisions as to soldiers' widows apply only to those who were married prior to the passage of the act. The fee of an attorney for presenting any claim under this act is limited to \$10, and any greater charge is made a misdemeanor, punishable by fine not exceeding \$500, or imprisonment at hard labor not exceeding two years, or both.

Widows or soldiers of the War of the Revolution receive \$8 per month. Survivors of the War of 1812 receive one-half pay at the rate received at the time discharged, and in case of their death leaving a widow, she receives the pension to which her deceased husband was entitled at his death. The survivors of the Mexican War and the widows of deceased soldiers, if not remarried, receive \$8 per month.

Before the name of any pensioner is placed upon the rolls, proof of the right to receive such pension is required, and false statements as to material facts render the person making them liable to indictment. Pensions are payable every three months, and agencies are established at different portions of the United States to distribute the vouchers to the proper persons. By statute of the United States, pension money due from the government is not

subject to attachment or garnishment, and in many states pension money, and the property which has been wholly purchased by pension money, is exempt, in whole or in part, from the payment of the debts of the pensioner, and cannot be reached by any court process.

According to the report of the United States Commissioner of Pensions for the year ending June 30, 1896, the whole number of pensioners on the roll at that date was 970,678. This was a gain of only 154 over the total for 1895. As there were added 40,374 new pensioners and 3,873 were restored, making a total of 44,247, it can readily be seen that the death rate is very large. The amounts disbursed for pensions was \$138,214,761.94,—a decrease of \$1,592,575.36 as compared with 1895. The average annual value of each pension was \$133.39; under the act of June 27, 1890, it was \$109.55. There were, at the time of the report, 495,664 claims pending. Of 410,922 of the individual claimants, 234,337 were already in receipt of pensions.

PENTATHIONIC ACID. See CHEMISTRY, Vol. V, p. 647.

PENTATHLON, a fivefold athletic "event" in the national games of the ancient Greeks. It included leaping, foot-racing, wrestling, throwing the discus and throwing the spear, which latterly took the place of boxing.

PENTELICUS. See ATTICA, Vol. III, pp. 58, 59.

PENTHESILIA. See AMAZONS, Vol. I, p. 655.

PENTLAND FIRTH. See CAITHNESS, Vol. IV, p. 647.

PENTLAND HILLS. See EDINBURGH, Vol. VII, p. 656.

PENTLANDITE. See MINERALOGY, Vol. XVI, p. 292.

PENUMBRA. See LIGHT, Vol. XIV, p. 581.

PENZANCE (JAMES PLAISTED WILDE), BARON, a British jurist; born in London, July 12, 1816; a nephew of Lord Truro; educated at Trinity College, Cambridge, graduating in 1838; called to the bar at the Inner Temple in 1839; appointed junior counsel to the excise and customs in 1840; queen's counsel in 1855; counsel to the Duchy of Lancaster in 1859; a baron of the exchequer in 1860, receiving a knighthood; became judge of the Court of Probate and judge ordinary of the Divorce Court in 1863, resigning in 1873; a Privy Councillor in 1864. He was created a peer of the United Kingdom in 1869, and became a member of the Final Court of Appeal in the House of Lords. In 1875 he was appointed judge, under the Public Worship Regulation Act, and judge of the provincial courts of Canterbury and York.

PEONY. See PÆONY, Vol. XVIII, p. 132.

PEOPLE'S PARTY. This name was given to a political party in the state of New York in 1824, an offshoot of the Democratic-Republicans, who favored the choosing of electors by the direct vote of the people. The party supported William H. Crawford, the Congressional caucus nominee of the Democratic-Republican party, who received in the electoral college 41 votes.

The name was later adopted by a party that was

evolved through the Greenback, Labor and Granger political organizations from 1884 to 1892. These associations, weak in isolated issues, tended to coalesce, and their aims became more clearly formulated and were seen to have a common purpose. The Greenback party became the National Greenback party, and in 1876 nominated for President and Vice-President Peter Cooper of New York and Samuel F. Cary of Ohio, the ticket polling 81,740 votes. The latter party, in the next Presidential campaign, expanded into the National Greenback-Labor party, and nominated for President and Vice-President James B. Weaver of Iowa and B. J. Chambers of Texas, the ticket polling 307,306 votes. In 1884 the party was commonly styled the People's Party and had its antimonopolistic champion in Benjamin F. Butler of Massachusetts, the Vice-Presidential candidate being A. M. West of Mississippi. This ticket polled 133,825 votes. The various elements constituting these parties then united with the Farmers' Alliance, and formed themselves into the People's Party, familiarly called the "Populists," whose origin and history up to 1892, when it held its first national convention, is detailed in the article on FARMERS' ORGANIZATIONS, in these Supplements. The aim of the party is to combine the wage-earners and the agriculturists of the country for the advancement of their interests, as against the exploitations of capital, and its socialistic character is pronounced, as may be seen from its platform.

The second national convention of the People's Party was held at St. Louis, July 22, 1896, and nominated, as its candidate, for President, William J. Bryan of Nebraska, who had already been declared the nominee of the regular Democrats, and for Vice-President, Thomas E. Watson of Georgia, in opposition to Arthur Sewall of Maine, who was on the Democratic ticket with Mr. Bryan.

The platform of 1896 declared for "natural money issued by the general government without the intervention of banks of issue, to be a full legal tender for all debts, public and private"; for free and unlimited coinage of silver and gold at the ratio of 16 to 1; for a volume of the circulating medium adequate "to restore the just level of prices of labor and production"; for legislation to "prevent the demonetization of the lawful money of the United States by private contract"; for the payment of its obligations, by the government, in any kind of lawful money, at its option; for an income tax; and for postal savings banks. It denounced the sale of government bonds to replenish the Treasury, unless explicitly authorized by specific acts of Congress, and the surrender by the government, to its creditors, of the option to choose the kind of money in which they are to be paid.

The platform further favored government ownership and operation of railroads and telegraphs; legislation against trusts and monopolies; the election of President, Vice-President and Senators by the direct vote of the people; home rule in the territories, and their early admission to statehood.

PEORIA, capital of Peoria County, northwestern central Illinois, is a city of remarkable growth and

promise. It is pleasantly located on the west bank of the Illinois River, at the south end of Peoria Lake, an expansion of the river, 159 miles S. of Chicago, 65 miles N. of Springfield, 53 miles E. of Galesburg and 43 miles W. of Bloomington. It is the second city in the state in population, and is laid out after the most approved plans, with wide streets intersecting each other at right angles, handsomely shaded, and brilliantly illuminated with gas and electric lights; a fine system of drives and parks has been established; there are 35 miles of paved streets, and the various parts of the city are connected by electric street-railways; the residence, business and manufacturing districts have been built up with elegant and substantial structures perfectly adapted for the uses to which they are respectively devoted, while the undulating prairies with which the city is surrounded are dotted with evidences of the taste and cultivation of the people. It is a prominent railroad city, being the intersection of the Chicago, Alton and St. Louis, Lake Erie and Western, Chicago, Peoria and St. Louis, Peoria Decatur and Evansville, Peoria and Pekin Union, Cleveland, Cincinnati, Chicago and St. Louis, Iowa Central, Toledo, Peoria and Western, Rock Island and Peoria, Chicago, Rock Island and Pacific, Chicago, Burlington and Quincy and Peoria Terminal railroads; also, the terminus of a line of steamboats that plies between the city and St. Louis. It contains a courthouse, United States government building, city hall, five first-class hotels, about thirty churches; the Peoria County normal school, a high school and a number of subordinate schools, six national, two private, four state and five savings banks; between two and three hundred stores devoted to every line of commercial endeavor; an opera-house and two public halls with an aggregate seating capacity of 4,100. The returns for 1890 showed 90 industries in 554 establishments, having a combined capital of \$15,072,567, giving employment to 7,696 persons, paying in wages \$4,327,637, and having a product valued at \$55,504,523. The representative industries embrace enterprises conducting the manufacture of engines and machinery, agricultural implements, trunks, glucose, brass fixtures, cigars, carriages, brushes, brooms, sashes, doors and blinds, soap, highwines and bitters, patterns, safes, baskets, mantels, coal-drills, saws, metal rope, jewelry, cornices, elevators, stoves and hardware specialties, marble mantels, grain-registers, watches, etc., and other intricate mechanical devices. The distilling industry is the most important, being represented by 13 establishments having an annual product of about 30,000,000 gallons of spirits, and an annual government tax of about \$25,000,000. Five daily newspapers, 2 of which are German, 11 weeklies and 2 monthlies are published here, and a heavy business is done annually in the shipment of bituminous coal taken from mines operated on the city's outskirts. The shipments of grain are very large, Peoria in 1890 ranking eighth in the United States in the amount of grain shipped. The population, which was 22,849 in 1870 and 29,259 in 1880, was in 1890 returned at 41,024. See also PEORIA, Vol. XVIII, pp. 515-516.

PEPIN, a Carlovian family. See PIPPIN, Vol. XIX, p. 114.

PEPIN LAKE, an expansion of the Mississippi River, separating the counties of Pierce and Pepin, in Wisconsin, from Goodhue and Wabasha in Minnesota, extending from Red Wing, in the latter state, to the mouth of the Chippewa River, a distance of 27 miles, and varying in width from two to three miles. The lake is a noted resort for fishermen, and is in the midst of a beautiful and picturesque region, the limestone bluff lining the shores rising in places to a height of four hundred feet.

PEPPER, WILLIAM, an American educator and author; born in Philadelphia, Aug. 21, 1843; son of



PROFESSOR PEPPER.

Dr. W. Pepper, professor of the theory and practice of medicine in the University of Pennsylvania (1860-64); graduated at the University of Pennsylvania, in the arts department, in 1862; in the medical department in 1864; became lecturer on morbid anatomy (1868-70); clinical medicine (1870-76); professor of the latter (1876-87); of the theory and practice of medicine (1887); provost

of the university (1881), resigning in 1894. He was assiduous in his efforts to extend and broaden the scope of the university, and during his office there were added the Wharton school of finance and economy; the department of veterinary medicine; the school of philosophy; the school of biology; the school of American history; the department of archaeology and palæontology, and that of hygiene. He was medical director of the Centennial Exposition, receiving for his services in connection therewith the knight commandership of the Order of St. Olaf of Sweden. He was president of the American Association of American Physicians (1891) and of the Pan-American Medical Congress at Washington (1893). He was the founder of *The Medical Times*, editing it the first year of its existence (1870-71). He published, in conjunction with Dr. John F. Meigs, *Diseases of Children* (1870), which went through many editions; and was the author of *Sanitary Relations of Hospitals* (1875); and edited the *System of Medicine by American Authors* (5 vols., 1885-86), which was his chief literary performance. The list of his contributions to the professional and other journals is a long and important one.

PEPPERS, Old World spice. See PEPPER, Vol. XVIII, pp. 516, 517.

PEPPERS, garden plants of the genus *Capsicum*. See CAYENNE PEPPER, Vol. V, p. 280; and HORTICULTURE, Vol. XII, p. 280.

PEPPERBRAND, a fungus. See AGRICULTURE, Vol. I, pp. 354, 355.

PEPPERIDGE, a tree. See BLACK GUM, CORNACEÆ, GUM-TREE, and TUPELO, in these Supplements.

PEPPERRELL, SIR WILLIAM, a British soldier; born in Kittery, Maine, June 27, 1696. At the age

of 21 he was appointed captain of a company of cavalry, and at the age of 30 was advanced to a colonelcy. In 1730 Governor Belcher appointed him chief justice of the court of common pleas, which office he retained until his death. In 1745 Colonel Pepperrell was appointed to command the New England expedition against Louisburg on the island of Cape Breton, and, supported by the fleet of Commander Warren, on June 17th captured it. He was created a baronet in 1746, colonel in the British army (1749), major-general (1775). He was appointed lieutenant-general (1759) and was acting governor of the colony (1756-58). He published, in 1753, *Conference with the Penobscot Tribe*. He died at his native place, July 6, 1759.

PEPSIN. See NUTRITION, Vol. XVII, pp. 675 et seq.

PEPTONIZED FOOD is prepared for the purpose of providing nutriment more easily digestible for those whose digestion is weak. The food is treated with pancreatin, which is obtained from the manufacturers in tubes or tablets containing quantities sufficient for one process. Milk is peptonized by adding to one pint of the fluid from 5 to 20 grains of pancreatin and 5 grains of bicarbonate of sodium, the milk being kept at a temperature of 100° for different periods not exceeding twenty minutes. Beef is peptonized by treating it similarly, a quarter of a pound of lean meat being finely minced and added to a pint of water warmed in a saucepan, the mixture being kept at blood-heat for a short time. The peptonizing may be arrested by bringing the liquids to a boiling-point, or by refrigeration, which stops the fermentative process.

PEQUODS OR PEQUOTS. See INDIANS, Vol. XII, pp. 827, 831.

PERA, a suburb of CONSTANTINOPLE; q. v., Vol. VI, pp. 306, 307.

PERÆA. See GILEAD, Vol. X, p. 595.

PERCEPTION. See PSYCHOLOGY, Vol. XX, pp. 51-57; and APPERCEPTION in these Supplements.

PERCHING BIRDS. See INSESSORES, in these Supplements.

PERCHLORIC ACID. See CHEMISTRY, Vol. V, p. 495.

PERCIDÆ. See PERCH, Vol. XVIII, pp. 521, 522; and ICTHYOLOGY, Vol. XII, p. 688.

PERCIVAL, JAMES GATES, an American poet and geologist; born in Kensington, Connecticut, Sept. 15, 1795. In 1815 he graduated at Yale, at the head of his class. After leaving college he taught school for a time, studied medicine and practiced in Charleston, South Carolina. In 1822, while in the last-named place, he published *Prometheus and Clio*. In 1824, Dr. Percival was appointed assistant army surgeon and professor of chemistry in the United States Military Academy, but resigned after a few months to become a surgeon in the recruiting service at Boston. At that time he contributed to the *United States Literary Magazine* and published a collection of his poems (2 vols., 1826). In 1827 he removed to New Haven, Connecticut, where he published the third part of his tragedy, *Clio*. In 1834 he made a particular study of geology, and in the year following was appointed to make a geologi-

cal and mineralogical survey of Connecticut, in connection with Professor Charles U. Shepard. In 1843 he published *Dream of a Day*. In 1853 he surveyed the lead region of the American Mining Company in Wisconsin and in 1854 was appointed geologist of that state. A complete collection of his *Poems* was published in two volumes (1859). He died in Hazel Green, Wisconsin, May 2, 1856.

PERCOPSIDÆ, the family of trout-perches. These fishes bear resemblances both to trout and perch. There are two genera, both North American. The sand-roller (*Percopsis*) is a small, valueless fish which lives near the shores of the Great Lakes, and is abundant near wharves. The genus *Columbia* is confined to rivers in the Columbia River region. It is a large fish and important as a food-fish.

PERCUSSION. See **MEDICINE**, Vol. XV, p. 815.

PERCUSSION FUSE. See **AMMUNITION**, Vol. I, p. 745.

PERCY, HENRY (HOTSPUR). See **PERCY**, Vol. XVIII, p. 523.

PERCY, JOHN, a British metallurgist; born in Nottingham, England, in 1817; educated in Paris and in Edinburgh, where he was a pupil of Sir C. Bell, and where he graduated M.D. For some years he was in medical practice at Birmingham. Dr. Percy was appointed, in 1851, professor of metallurgy in the Royal School of Mines, holding that office till December, 1879. He was the author of an important work on *Metallurgy; or, The Art of Extracting Metals from Their Ores and Adapting Them to the Various Purposes of Manufacture*, with illustrations (1861); *The Metallurgy of Gold, Silver and Lead* (1869); and *The Metallurgy of Lead, Including Desilverization and Cupellation* (1871). The Iron and Steel Institute, on Jan. 25, 1877, awarded their Bessemer medal to Dr. Percy for his works on metallurgy, especially those on iron and steel. He died June 19, 1889.

PERDU, a mountain. See **PYRENEES**, Vol. XX, p. 125.

PEREDA, JOSÉ MARIA DE, a Spanish novelist; born in Santander in 1833; early devoted himself to the study of the life he found around him, and gave it literary expression in the form of sketches, which began to appear about 1855 in a journal published in his native town. These sketches he collected in 1864, and published, with the title *Escenas Montañesas*. This was followed by *Tipos y Paisajes* (1871); *Bocetos al Temple* (1876); *Tipos Trashumanes* (1877); *El Buey Suéto*, a more ambitious attempt (1877); *Don Gonzalo González de la Gonzalera*, a political tale (1878); *De tal Palo, tal Astilla* (1879); *Esbozos y Rasguños* (1881); *Pedro Sánchez* (1883); *Sotileza* (1884); *La Montálvez* (1887); *La Puchera* (1888); *Nubes de Estío* (1891); *Al Primer Vuelo: Idilio Vulgar* (1891); etc.

PEREGRINE FALCON. See **FALCON**, Vol. IX, p. 2.

PÈRE HYACINTHE. See **LOYSON, CHARLES**, in these Supplements.

PEREIRA DA SILVA, JOÃO MANOEL, a Brazilian historian; born at Rio de Janeiro, Aug. 30, 1817; graduated in law at Paris; settled in Brazil, becoming engaged in politics, but more famous as an

author. He published *Plutarco Brasileiro* (1847); *Varões Ilustres do Brasil* (1858); *História da Fundação do Imperio Brasileiro* (1864-68); *Segundo Período do Reinado de D. Pedro I* (1871); *História do Brasil de 1831 a 1840* (1878); etc.

PÈRE LA CHAISE. See **CEMETERY**, Vol. V, p. 331.

PERESKIA. See **CACTUS**, Vol. IV, p. 626.

PEREZ, SANTIAGO, a Colombian diplomat; born in Zipaquirá, in 1830. As he grew up he engaged in journalism and politics; was elected to Congress in 1863, and the next year became Secretary of Foreign Relations. Afterward he sat in the Senate, was minister to the United States, and from 1874 until 1876 President of Colombia. He served another term as minister at Washington and afterward devoted himself to literature, having published dramas, etc.

PEREZ GALDÓS, BENITO, a Spanish novelist; born in 1845, at Las Palmas, in the Canary Isles. As a writer of fiction he first distinguished himself by the publication of two historical romances relating to the state of Spain in 1820 and 1824, and entitled, respectively, *La Fontana de Oro* (1871) and *El Audaz*. Next, in imitation of MM. Erckmann-Chatrian, he published two series of *Episodios Nacionales*, the first dealing with subjects taken from the war of independence against Napoleon and the second describing the struggle of Spanish liberalism against the tyranny of Ferdinand VII. These novels achieved a great success in Spain and were also widely read in Spanish America. They include *Bailén* (1873-75); *Napoleón en Chamartin* (1874); *Cádiz* (1874); *La Batalla de los Arapiles* (1875); *El Terror de 1824* (1877); *Doña Perfecta* (1880); *El Amigo Manso* (1881); *Lo Prohibido* (1884); *Miau* (1888); *La Incógnita* (1890); *Angel Guerra* (1891). Admitted to the Spanish Academy in 1897.

PERFECTIBILISTS. See **ILLUMINATI**, Vol. XII, p. 706.

PERFECTING PRESSES. See **PRESSES**, in these Supplements.

PERFECTIONISM, the name of a doctrine of a mystical state in which the believer is freed from responsibility for sin in his members. In no case do those who claim to have reached perfection assume superiority for goodness over others, as their condition is purely the work of grace, so that they can lay no claim of merit to it, and because they are only free from imperfections and guilt in not consenting to it. The doctrine has had many phases of expression, from the rapture of a John Tauler or a Madame Guyon to the Oneida Brethren of New York, who bore the self-selected name of "Perfectionists" (see Vol. XVII, pp. 772, 773). Support for the doctrine is found in such passages as "whoever is born of God sinneth not; but he that is begotten of God keepeth himself, and that wicked one toucheth him not" (1 John v, 18). The root of the corresponding experience is simply such complete self-consecration to God, that the soul rejects all estrangement, and wishes nothing but to do God's will. Of course, such a disposition is possible, though rare. It does not imply, however, that the soul realizes its ideal in performance, but only

in intent. Hence the perfected one may show the limitations of ignorance, prejudice and even of the surprises of passion. The whole experience is mystical, is peculiar to certain dispositions, and stands on the brink of antinomianism—sometimes fall over into the abyss.

Recognizing that all men have not equal capability of devotion, the Roman Catholic Church has its "Counsels of Perfection" for those who feel the vocation to a complete spiritual life. It distinguishes between the obedience necessary to salvation and the works which are counseled of God, but not commanded. There are mortal and venial sins, and the first are violations, of imperative law. Venial sins do not imperil salvation, and are not incompatible with works that may be done by those who "would be perfect." Hence arises a doctrine of works of supererogation, or that belong to the "Counsels of Perfection." Those who do them do so of divine grace, and hence acquire no personal merit in their performance. But these gifts of God are to the church, through the individual, and hence are susceptible of vicarious use.

Among Quietists, Friends, Plymouth Brethren and certain Methodists, as well as among other unworldly sects of mystic tendencies, perfection is the equivalent for a state of sanctification, and not for the complete achievement thereof. It is potential sanctification,—a keeping of God. They sometimes call it "entire sanctification," meaning a complete consecration of soul to God,—a dominant, all-pervading purpose to do God's will. The wrong they do they would not. In their state of grace they are not responsible for sin working in their members, or for the delusions and betrayals of the devil.

The achievement of consecration, even to utter self-effacement, is possible for weak, limited and tempted man. Too often those who think they have reached that state find, in the stress of trial, that they have been self-deluded; others, overcome by temptation, have claimed that for the pure in heart there is no law, and so have given themselves up to follow their own impulses.

Dogmatic Christianity allows scant place for entire sanctification or perfectionism on earth. The orthodox Protestant belief is that sanctification is a progressive process never completed this side of the grave, and that every Christian has daily need to pray for the forgiveness of sins.

PERIANTH. See BOTANY, Vol. IV, p. 126.

PERICARDITIS. See RHEUMATISM, Vol. XX, p. 517.

PERICARDIUM. See ANATOMY, Vol. I, p. 899.

PERICARP. See BOTANY, Vol. IV, pp. 148, 149.

PERICHÆTA. See WORMS, Vol. XXIV, p. 683.

PERICLES, AGE OF. See *Third Period*, under ARCHÆOLOGY, Vol. II, pp. 354-360.

PÉRIER, AUGUSTE CASIMIR VICTOR LAURENT, a French politician; born in Paris in 1811; son of C. Périer (1777-1832) and father of Casimir-Périer, ex-President of the French Republic (q.v., in these Supplements). He was elected a Deputy in 1846, and was in the Legislative Assembly of 1849, in

which he voted against the *coup d'état* of 1851. He was appointed Minister of the Interior by Thiers in 1871. He was a contributor to the *Revue des Deux Mondes* on financial subjects. He died June 6, 1878.

PÉRIER, CASIMIR. See CASIMIR-PÉRIER, in these Supplements.

PÉRIER, CASIMIR, a French statesman; born in Grenoble, Oct. 2, 1777; the son of a merchant; educated at Lyons; served for a time in the army; in 1800 he engaged with his brother, Scipion, in banking, in Paris; elected a member of the Chamber of Deputies (1817). He became Prime Minister to Louis Philippe, March 31st, and held the office until his death, caused by cholera, May 16, 1832. A vivid impression is given of the vigorous Premier by Guizot in his *Mémoires*.

PERIGEE. See APOGEE, in these Supplements.

PERIHELION. See ASTRONOMY, Vol. II, p. 795.

PERIM, a small island at the entrance of the Red Sea, in the Strait of Bab-el-Mandeb, about 9 miles from Africa and 1½ miles from the Arabian coast, in lat. 12° 40' N., long. 43° 23' E. It is about 3½ miles long, has an average width of 1¼ miles, an altitude of 245 feet in the highest part, is barren and destitute, and of little value aside from its commanding position. There is a walled light-house, and on the west side a large harbor. The island was temporarily occupied by the British in 1799, and permanently taken possession of in 1857. In 1884 it was made a coaling-station.

PERIODICALS. See Vol. XVIII, pp. 535-544; and MAGAZINES, in these Supplements.

PERIODIC RELATIONS OF THE ELEMENTS. See CHEMISTRY, Vol. V, pp. 543, 544.

PERIŒCI. See SPARTA, Vol. XXII, p. 370.

PERIOSTEUM and PERIOSTITIS. See SURGERY, Vol. XXII, pp. 684, 685.

PERIPATUS. See MYRIOPODA, Vol. XVII, pp. 116, 117.

PERISCOPE, an instrument used on submarine boats for enabling a person inside to see about the horizon above. It consists of an upright telescope, with a mirror placed at the lower end, so that the observer can look in horizontally. At the top is placed a lenticular total-reflecting prism. The apparatus may be turned toward any part of the horizon. See ALTISCOPE, in the Supplements.

PERISSODACTYLA. See MAMMALIA, Vol. XV, p. 427.

PERISTALSIS. See NUTRITION, Vol. XVII, pp. 670, 671.

PERISTEROPODES. See GUAU, Vol. XI, p. 232.

PERISTYLE. See ARCHITECTURE, Vol. II, p. 469.

PERITONEUM. See DIGESTIVE ORGANS, Vol. V, p. 224; and PERITONITIS, Vol. XVIII, p. 547.

PERIWINKLE, a plant. See *Vinca*, under HORTICULTURE, Vol. XII, p. 253; and MOLLUSCA, Vol. XVI, p. 650.

PERKIN, WILLIAM HENRY, an English chemist, and the discoverer of aniline; born in London.

March 12, 1838. He was educated at the City of London School; made phenomenal progress in chemistry under Dr. A. W. Hoffman, at the Royal College of Chemistry, becoming assistant to the latter in 1855. The following year, while conducting an experiment at home for the production of quinine synthetically, he discovered "aniline purple" or "mauve." This discovery led to the development of the industry of the production of colors from coal-tar products, which became, in his hands, in association with his father and brother, under their firm name of Perkin and Sons, an immense enterprise. He retired from the prosecution of technical work in 1873. During all the period of his active research he conducted many investigations in other lines, one of his more noted achievements being in connection with salicylic aldehyde, showing that this substance is not only an aldehyde, but a phenol. This resulted in the artificial production of coumarin and other odoriferous substances. A new reaction known as "Perkin's reaction" also resulted, by means of which other experimenters were able to produce cinnamic acid. His researches into the property of substances to rotate the plane of polarization when placed in the field of a magnet, by showing that it varies with bodies in a definite manner, was of the first importance as making available a new means of determining the constitution of bodies. In 1866 he was elected a fellow of the Royal Society; elected president of the Chemical Society in 1883; received the degree of Ph.D. from Würzburg in 1882; and that of LL.D. from St. Andrews in 1891. He received the royal medal and the Davy medals from the Royal Society, and the Albert medal from the Society of Arts.

PERKINS, CHARLES, an American art critic; born in Boston, March 21, 1823; graduated at Harvard in 1844; studied art in Paris and in Rome; he then took to etching and illustrated his own books; visited Europe frequently with the object of becoming an experienced art critic in his native country. The first work to bring him into notice was *Tuscan Sculptors* (2 vols., 1865), with over seventy of his own etchings. He also published *Italian Sculptors* (1868); *Art in Education* (1870); *Raphael and Michael Angelo* (1878); *Sepulchral Monuments in Italy* (1883); *History of the Handel and Haydn Society* (1883); and *Ghiberti et son École* (Paris, 1886). All these works exhibited his diligence in securing fresh biographical data. He annotated Jacob von Falke's *Art in the Household* (1879); and in collaboration with J. D. Champlin, Jr., brought out an *Encyclopædia of Painters and Painting* (4 vols., 1886-88). He died in Windsor, Vermont, Aug. 25, 1886.

PERKINS, ELISHA, an American physician; born in Norwich, Connecticut, Jan. 16, 1741; educated for the medical profession by his father, also a physician. After practicing his profession for a time he invented, in 1796, what he called metallic tractors, consisting of pins about three inches long, and pointed, and which he said were of a peculiar composition of metals, but which were asserted by those who examined them to be simply pieces of brass and steel. With his invention he effected a marvelous number of cures of gout, rheumatism and kin-

dred diseases. His son proceeded to London and interested a great number of influential parties in the invention, and, under the patronage of Lord Rivers, established a Perkinian institution for the treatment of diseases by the system, called Perkinism. Innumerable cures were effected and attested to by many in the front rank of the profession; but skeptics claimed that the alleged "cures" were simply the result of imagination, and not due to any inherent property of metals "peculiarly composed," as advanced by the inventor. He later invented a remedy for the cure of yellow fever, and during an epidemic of that disease in New York City tested it unsuccessfully upon himself, falling a victim to the disease, Sept. 6, 1799.

PERLIDÆ. See INSECTS, Vol. XIII, p. 152.

PERMANGANATES. See MANGANESE, Vol. XV, pp. 480, 481.

PERMEABILITY, MAGNETIC. See ELECTRICITY, § 57, in these Supplements.

PERMIAN SYSTEM. See GEOLOGY, Vol. X, pp. 351, 352.

PERMUTATION. See ALGEBRA, Vol. I, pp. 560, 561.

PERNOFF. See PERNAU, Vol. XVIII, p. 552.

PERONOSPOREÆ. See FUNGUS, Vol. IX, p. 830.

PÉROUSE, JEAN FRANÇOIS. See LA PÉROUSE, Vol. XIV, p. 298.

PEROWNE, JOHN JAMES, a British clergyman and bishop of Worcester, England; born March 13, 1824, in Burdwan, Bengal, India, of French extraction; educated at Corpus Christi College, Cambridge; was a distinguished scholar and prizeman, graduating in 1845; elected a fellow in 1849; was examiner, select preacher and lecturer in the university for many years; lecturer and a professor in King's College, London; vice-principal of St. David's College, Lampeter (1862-72); canon residentiary of Llandaff (1869-78); Hulsean professor of divinity in Cambridge (1875); and in the latter year appointed chaplain to the Queen. In 1878 he was nominated to the deanery of Peterborough, and in 1890 to the bishopric of Worcester. In 1884 he received the degree of D.D. from Edinburgh; in 1888-89 was select preacher at Oxford; and was a member of the company engaged in the revision of the Old Testament. He was author of *The Book of Psalms: A New Translation*; *The Athanasian Creed*; *Confession in the Church of England*; *The Church, the Ministry, the Sacraments*; *Disestablishment and Disendowment*; and *The Interest of the People of England in the Maintenance of the Church of England*.

PEROXIDE OF HYDROGEN. See BLEACHING, Vol. III, p. 825.

PERPETREA, CAPE, a point of land on the Pacific Coast, in northern Lane County, central western Oregon. On it is situated a lighthouse with a fixed white light of the first order, 150 feet above sea-level. Lat. 44° 16' 33" N., long. 124° 5' W.

PERPETUITY. See ANNUITIES, Vol. II, pp. 72, 73.

PERRAULT, CLAUDE (1613-88), a French archi-

tect, brother of Charles (Vol. XVIII, p. 556). See PARIS, Vol. XVIII, p. 292.

PERRON, stairs. See ARCHITECTURE, Vol. II, p. 469.

PERRON, DU. See ANQUETIL DU PERRON, Vol. II, pp. 90, 91.

PERROT, GEORGES, a French archæologist; born in Villeneuve-Saint-Georges, department of Seine-et-Oise, France, Nov. 12, 1832; studied in Athens, at the French school (1855-58). He went upon a tour of exploration in Asia Minor in 1861, after which, returning to Paris in 1863, he became professor of rhetoric in the Lyceum Louis le Grand; in 1872 professor of Greek language and literature in the higher normal school; in 1877 professor of archæology in the Faculty of Letters; in 1883 appointed director of the higher normal school. He wrote *Exploration Archæologique de la Galatie et de la Bithynie* (1863-72); *Souvenirs d'un Voyage en Asie Mineure* (1864); *Essai sur le Droit Public et Privé de la République Athénienne* (1867); and, with C. Chipiez, *Histoire de l'Art dans l'Antiquité* (5 vols., 1881-89).

PERRY, a city of Dallas County, southwestern central Iowa, on the Raccoon River, and on the Chicago, Milwaukee and St. Paul and Chicago, Rock Island and Pacific railroads, 34 miles W.N.W. of Des Moines. It is in an agricultural, stock-raising and coal-producing region; has good public schools, electric lights, water-works, a daily and three weekly papers, foundries, flour-mills and machine-shops. Population 1890, 2,880; 1895, 3,750.

PERRY, a city and the capital of Noble County, northeastern Oklahoma, 34 miles N. of Guthrie, on the Atchison, Topeka and Santa Fé railroad. Settled in 1893, the growth of this place has been remarkable. It contains churches, public and private schools, banks, a board of trade, United States land-office, a daily and five weekly papers, and is an important trade center for a large surrounding territory. Estimated population 1895, 3,500.

PERRY, ARTHUR LATHAM, an American educator; born in Lyme, New Hampshire, Feb. 27,

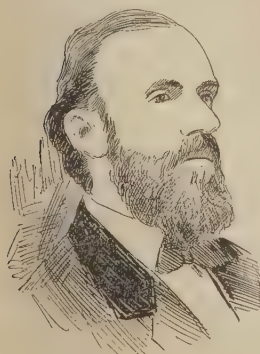
1830; graduated at Williams College, Massachusetts, in 1852; professor of history and political economy in that institution in 1854. He was an ardent advocate of free trade; a contributor of economic articles to a number of journals, and participated in public debates with Horace Greeley upon tariff questions before New York and Boston audiences. He wrote *The Elements of Political Economy* (1865); *Introduction to Political Economy* (1877); and *Williamstown and Williams College*.

PERRY, JOHN, an English electrician and physicist; born in Garvagh, a town in Ulster, Ireland, in 1850; graduated at Queen's University of Ireland,

in 1870, as bachelor of engineering. In 1882 the university senate conferred upon him the honorary degree of master in engineering. From 1870 to 1874 he lectured on physics at Clifton College; was secretary of the A section, British Association, in 1874; and in the same year became the assistant and associate of Sir William Thomson (see KELVIN, in these Supplements). In 1875 he read a paper on *The Electric Conductivity of Glass as Dependent on Temperature*, before the Royal Society of London; and another paper, conjointly with Sir William Thomson, on *Capillary Surfaces of Revolution*, before the Royal Society of Edinburgh. In 1875 he went to Japan as instructor in the Imperial College of Engineering, returning home in 1879. In 1882 he became professor of mechanical engineering and applied mathematics in the Finsbury Technical College, conjointly with Professor William E. Ayrton (q.v., in these Supplements). He was inventor of a large number of practical electric appliances, among which are meters of various sorts, a dynamo, motors, accumulators, switches, an electric lamp, and many others. He became a fellow of the Royal Society in 1885; and the degree of doctor of science was conferred on him by the Royal University of Ireland. Perhaps his most valuable invention is the electric-supply meter. Besides the papers mentioned, he wrote upon *The Future Development of Electrical Appliances* (1881), and a number of others in partnership with Professor Ayrton.

PERRY, NORA, an American poetess and authoress; born in Webster, Massachusetts, in 1841, her parents removing to Rhode Island while she was still a baby. She was a precocious reader, and her first story, *The Shipwreck*, was written when she was eight years old. It was never published. Her first successful poem, *Tying Her Bonnet under Her Chin*, was first published in a Washington newspaper, but subsequently obtained almost a world-wide circulation. Another poem, *After the Ball*, achieved as great popularity, and in 1874 her first volume of poems, *After the Ball, and Other Poems*, was published. Others among her published works are *The Tragedy of the Unexpected* (1880); *Book of Love Stories* (1881); *For a Woman* (1885); *A Flock of Girls* (1887); and her last work, *Lyrics and Legends* (1891). She was a frequent contributor to magazines. She died in Dudley, Massachusetts, May 13, 1896.

PERRY, OLIVER HAZARD, an American naval officer; born in South Kingston, Rhode Island, Aug. 23, 1785. On April 7, 1799, he received his commission as midshipman, and on Jan. 15, 1807, was promoted lieutenant. After building a fleet of gunboats, he commanded the schooner *Revenge*, which in 1810, cruised off the southern coast of the United States. This vessel was wrecked on a reef near Watch Hill, Rhode Island, Jan. 8, 1811, but Perry was honorably acquitted of neglect or carelessness by a court of inquiry. Thereafter he repeatedly applied for a command at sea, which was refused, and eventually offered his services to Commodore Isaac Chauncey on the lakes, who ordered him for duty to Lake Erie. Here, at Presque Isle (now Erie), he superintended the



PROF. A. L. PERRY.

building of a number of small vessels, the largest of which was of 500 tons burden; with them he



COMMODORE O. H. PERRY.

expected to encounter the British flotilla under Captain Barclay. Perry's squadron consisted of nine vessels, of 1,671 tons, with 54 guns. On the British side, Captain Robert Heriot Barclay had a flotilla of six vessels, of 1,460 tons, manned by 450 men and 63 pieces of cannon. On Sept. 10, 1813, the American forces moved out of Put-in-Bay for action, and after a hard-fought contest on the afternoon of that day the British flotilla surrendered. Captain Barclay was wounded in the action. Perry's announcement of the event was by the famous dispatch: "We have met the enemy and they are ours." Congress bestowed on Perry the rank of captain, and the British, having lost control of Lake Erie, evacuated Detroit. Perry served in the Mediterranean under Decatur, and in 1819 was sent in command of a squadron to the Caribbean Sea, where, on the Orinoco River, he died of yellow fever, Aug. 23, 1819. His remains were, by order of Congress, removed to Newport in a ship of war, and interred in the cemetery there, Dec. 4, 1826. The state of Rhode Island has erected a fine obelisk over his grave, and two statues have been erected in his memory,—one of marble, at Cleveland, Ohio, in 1860, and another of bronze, at Newport, Rhode Island, in 1885.—His brother, MATTHEW GALBRAITH PERRY, a commodore in the United States navy, was born in Newport, Rhode Island, April 10, 1794. He conducted the skillful negotiations which, without force or bloodshed, opened Japan to foreign commerce in 1854. He died in New York, March 4, 1858.

PERRY, WILLIAM STEVENS, an American clergyman, bishop of the Protestant Episcopal Church; born in Providence, Rhode Island, Jan. 22, 1832; graduated at Harvard in 1854, and entered holy orders in 1857. He began as an evangelical, but in later years, became a recognized champion of the highest episcopal prerogative. He held rectorships and assistantships in Boston, in Portland, Maine, in Nashua, New Hampshire, and in other places. He became president of Hobart College in 1876, and bishop of Iowa and president of Griswold College in the same year. In 1891 he publicly refused to consent to Phillips Brooks's consecration as bishop of Massachusetts unless Dr. Brooks should retract his rejection of the dogma of apostolic succession. His compiled works are numerous. He furnished the articles on points of rites, titles, ceremonial forms, paraphernalia and prelatial honors for a recent edition of an American Cyclopædia.

PERRYSBURG, a village of Wood County, northwestern Ohio, at the head of navigation on the Maumee River, nine miles S.W. of Toledo, and on the Cincinnati, Hamilton and Dayton railroad. It has

good water-power and manufactures of flour and lumber. Ship-timber and staves are shipped in large quantities from this point. Population 1890, 1,747.

PERRYVILLE, a village of Boyle County, central Kentucky, about 40 miles S.W. of Lexington and 12 miles W. of Danville. It is celebrated as the scene of a hard-fought battle between the Union and Confederate armies of Buell and Bragg, Oct. 8, 1862. General Bragg, with 40,000 troops, was retreating into East Tennessee when, overtaken by Buell with 58,000 men, he was forced to turn and give battle. The fight was a desperate one, lasting all day, and at its close Bragg retired, but was not followed by Buell. The Union loss was placed at 4,300, and the Confederates were thought to have been even heavier. Population 1890, 436.

PERRYVILLE, a village and the capital of Perry County, southeastern Missouri, 76 miles S.E. of St. Louis, 14 miles S. of Chester, Illinois, and about 10 miles from the Mississippi River, on the Chester, Perryville, Ste. Genevieve and Farmington railroad. It is in a region producing large quantities of wheat, besides corn, oats, barley, wool, sorghum, potatoes, tobacco and live-stock. Population 1890, 875.

PERSEPHONE. See PROSERPINE, Vol. XIX, p. 824.

PERSEUS, the last king of Macedon. See ROME, Vol. XX, p. 753.

PERSIA. (For general article, see PERSIA, Vol. XVIII, pp. 561-660.) The latest published official census (that of 1891) reported the area at 628,000 square miles. Population, based mainly on estimates, as follows:

Inhabitants of cities-----	2,000,000
Population belonging to wandering tribes-----	2,000,000
Inhabitants of villages and country districts----	3,750,000

Total population ----- 7,750,000

The number of Europeans and Americans residing in Persia does not exceed 450.

The principal cities of Persia are: Teherân, with a population of 210,000; Tabriz, with 165,000; Isfahân, Meshed, each with 60,000; Barfurush, with 50,000; Kerman, Yazd, each with 40,000; Hamadan, Shiraz, Kazvin, Kom, Kashan, Resht, each with 25,000 to 30,000 inhabitants. Of the nomads, 260,000 are Arabs; 720,000 Turks; 675,000 Kurds and Leks; 20,700 Baluchis and gipsies; 234,000, Lurs.

REIGNING SHAH AND ROYAL FAMILY. Muzafer Ed Din (q.v., in these Supplements) succeeded to the throne upon the assassination of his father, Nasr Ed Din (q.v., in these Supplements), May 1, 1896, and was crowned June 8, 1896. Muzafer Ed Din, born March 25, 1853, has 4 sons and 15 daughters.

The royal family is very numerous; there are some thousands of princes and princesses, but the official year-book only mentions 3 brothers, 3 sisters, 140 uncles, great-uncles and cousins of the Shah.

The Shah of Persia—by his official title "Shâh-in-shâh," or "king of kings"—is absolute ruler within his dominions, and master of the lives and goods of all his subjects.

The whole revenue of the country being at their

disposal, recent sovereigns of Persia have been able to amass a large private fortune. The wealth of Nasr Ed Din was reported to amount to \$25,000,000 or \$30,000,000, most of it represented by diamonds, the largest, the Derya i Nur, of 186 carats, and the Tâj i Mâh, of 146 carats, and other precious stones, forming the crown jewels.

The government of Persia is a pure despotism, limited only by the power and influence of the Mohammedan mollahs or priests, domestic intrigues, dread of private vengeance and an occasional insurrection. The first-named is the principal check against unjust government on the part of the monarch, while the latter three operate as powerful restraints on his ministers. The Shah possesses absolute authority over the lives and property of his subjects. His deputies, the governors of provinces and districts, possess similar authority over those under them; their actions are, however, liable to revision by the Shah, who may summarily inflict any punishment upon them for real or alleged misgovernment. Oppression of the sedentary agricultural classes is almost a necessity of such a form of government. The central government consists of a ministry, nominally modeled somewhat after the cabinets of European states. Usually, however, the power falls actually, if not nominally, into the hands of one of their number. The Shah, nevertheless, is in reality his own prime minister, and even trivial matters are submitted for his personal decision. The principal ministers are those for the interior (practically the head of the government), for foreign affairs, for finance, for war, for telegraphs, etc., for justice, and the president of the council, who is at the same time postmaster-general and general secretary of state. The law, both in civil and criminal cases, is administered by the governors, who not infrequently refer points of law, which is based upon the Koran and its commentaries, to mollahs and mushteheds. The punishments commonly inflicted are fines, flogging (the *bastinado*) and death, either by decapitation, stabbing or torture. The principal *hâkim*, or governors of provinces, are chosen, for the most part, from among the members of the royal family. As a rule, life and property are much more secure than is generally supposed. The revenue is derived from (1) a tax on the gross produce of land—25 per cent may be taken as the average assessment; (2) duties on cattle and flocks—in case of goats, sheep and cows, 8 per cent on value of wool and butter yielded; (3) customs dues; and (4) duties on provisions brought to market. It will thus be seen that the direct taxation falls almost exclusively on the land and its cultivators. In theory, these are the taxes authorized by the government, but in practice a frightful system of bribery and extortion prevails. The wealthy and influential escape the rapacity of the provincial governors, but as much as possible is taken from the hard-working peasants. It is believed that the irregular exactions amount to a sum equal to the legal assessments, and that not a penny of the money so extorted is applied to public purposes. The annual revenue in 1893-94 may be stated at \$6,841,500.

Elementary education is very generally diffused among all classes. There is a large number of colleges, where students are instructed in religion and Persian and Arabian literature. Among a considerable section of the upper classes it is asserted that the Mohammedan religion is losing its hold, and that unbelief is widely prevalent.

From the earliest times down to the present century Persia was divided into seven or eight great divisions, but about the time when it was attempted to introduce European civilization into the country and discipline into the army, the country was divided anew into 25 provinces. There are many interesting ruins of ancient, populous and celebrated cities in Persia; e.g., Persepolis and Istakhr, Rhages or Rhe, Shahpur, Tus, Merv, Shushan, Hamadan, etc.

The Persian army, according to official returns of the Minister of War, numbers 105,500 men, of whom 5,000 form the artillery (20 batteries); 54,700 the infantry (78 battalions); 25,200 the cavalry, regular and irregular; and 7,200 militia (24 battalions). Of these troops, however, only half are liable to be called for service, while the actual number embodied—that is, the standing army—does not exceed 24,500. The number liable to be called for service is as follows: Infantry, 35,400; irregular cavalry, but more or less drilled, 3,300; undrilled levies, 12,130; artillery, 2,500; camel artillery, 90; engineers, 100; total, 53,520. The organization of the army is by provinces, tribes and districts, a province furnishing several, a tribe one or two, and a district one regiment.

The trade of Persia is comparatively of little importance. The silk used to be the great staple, and is produced in almost every province, but chiefly in Ghilan, Kashan and Yezd. The repeated failure of the crop has, however, interfered very seriously with this branch of industry. Cotton and woolen fabrics, shawls, carpets and felts are largely manufactured for use and export. Trade is carried on by caravans with the interior of Asia and the chief towns of Persia. The principal trade centers are Tabriz, Teherân, Ispahân and Bushire. In recent time the communication between Persia and foreign countries has been greatly increased by way of the Caspian, owing to the development of the copious petroleum-wells at Baku. By means of the cheap fuel thus obtained the Russian commercial fleet on the Caspian has increased fourfold, and railways have been made from Batoum, on the Black Sea, to Baku, on the Caspian, and on other lines. The imports for 11 months ending February, 1893, were \$3,781,500; the exports, \$1,544,500. Many projects of railways have been formed, but up to 1894 only one of them had been carried out—viz., from Teherân to Shah Abul Azim, a place of pilgrimage distant only six miles. Tramways were laid down in Teherân, and an imperial bank established, with branches in the other large towns, in 1889.

In 1895 the country was visited, during January, with a number of earthquake shocks of great severity. At Kuchan and other places the destruction of property and mortality were immense. In one mosque six hundred persons, who sought refuge

there, were killed. The cold was intense, and many people perished from exposure. In August of the same year the entire city of Tabriz rose in a bread riot against the governor, who was held responsible for a heavy rise in price. Many people were killed by the soldiers, but the suspension of the governor and fall in prices restored quiet.

PERSIAN ARCHITECTURE. See Vol. II, pp. 399-401.

PERSIAN BERRIES. See FRENCH BERRIES, in these Supplements.

PERSIAN CERAMICS. See POTTERY, Vol. XIX, pp. 619-622.

PERSIAN GULF. See ARABIA, Vol. II, pp. 235, 238.

PERSIAN INSCRIPTIONS. See PERSIA, Vol. XVIII, p. 655.

PERSIAN INSECT POWDER, a powerful insecticide prepared from a dried plant of the genus *Pyrethrum*, one of the *Compositæ*. The plant is largely cultivated in California, where large quantities of the powder are manufactured and exported.

PERSIAN LANGUAGE. See PERSIA, Vol. XVIII, pp. 653-655.

PERSIAN LITERATURE. See PERSIA, Vol. XVIII, pp. 655-660.

PERSONAL EQUATION OR ERROR. See TIME, Vol. XXIII, p. 396.

PERSONALITY OR IDENTITY. See *Self*, under PSYCHOLOGY, Vol. XX, pp. 83-85.

PERSPECTIVE. See PROJECTION, Vol. XIX, pp. 804-806.

PERSPECTIVE PROJECTION. See GEOGRAPHY, Vol. X, pp. 202-205.

PERSPECTOGRAPH, a device for mechanically fixing the principal points of a perspective drawing. It consists of a frame with a hole for an eye-piece, and a pointer which is swung between the eye and the scene viewed. A piece of paper is used to record the points noted, as the pointer is brought opposite to them. In this way the main outlines of a drawing may be arranged in correct perspective.

PERSPIRATION OR SWEAT. See NUTRITION, Vol. XVII, p. 685.

PERTH AMBOY, a city and port of entry of Middlesex County, eastern New Jersey, on Raritan River where that stream empties into Raritan Bay, at the south end of Staten Island Sound, and on the Central of New Jersey, the Lehigh Valley and the Pennsylvania railroads, opposite Tottenville, New York. It is connected with the latter point by ferry, and is 22 miles S.W. of New York City. The city is in a region in which deposits of kaolin and fire-clay are found; has churches and good schools, among the latter a young ladies' seminary; coal and freight wharves of the Lehigh Valley railroad; state and savings banks; a daily, two weeklies and a semimonthly newspaper. Among the industries of the city are a cork-factory, emery-mills, terra-cotta works, foundry and machine-shop, cigar manufactory, electric-light works, oil refinery, chemical works and manufactures of fire and glazed brick, and drain-tiles. The city has a spacious and excellent harbor, and carries

on a considerable commerce. Population 1890, 9,512; 1895, 13,030.

PERTURBATIONS. See GRAVITATION, Vol. XI, pp. 72-74.

PERU, REPUBLIC OF. There has been no recent census, but the general opinion is expressed that the real present figures would not vary much from those of 1876. The republic is divided into 19 departments, the area and population of which were reported as follows at the last census taken (in 1876):

DEPARTMENTS.	AREA IN SQUARE MILES.	POPULATION.
Piura -----	13,931	135,502
Cajamarca -----	14,188	213,391
Amazonas -----	14,129	34,245
Loreto -----	32,727	61,125
Libertad -----	15,649	147,541
Ancachs -----	17,405	284,091
Lima -----	14,760	{ 226,922
Callao -----		
Huancavelica -----	10,814	104,155
Huanuco -----	33,822	{ 78,856
Junin -----		
Ica -----	6,295	209,871
Ayacucho -----	24,213	60,111
Cuzco -----	95,547	142,305
Puno -----	39,743	238,445
Arequipa -----	27,744	256,594
Moquegua -----	22,516	160,282
Apurimac -----	62,325	28,786
Lambayeque -----	17,939	119,246
Totals -----	463,747	85,984

The carefully estimated total population in 1888 was 2,690,945. Total area, 463,747 square miles. Population of Lima, the capital, 101,488.

There are besides, about 350,000 uncivilized Indians.

As a result of the war with Chile, the latter country has annexed the province of Tarapacá. The Chileans also occupy the department of Tacna for ten years, after which a popular vote is to decide to which country it is to belong.

CONSTITUTION AND GOVERNMENT. The present constitution, proclaimed Oct. 15, 1856, was revised Nov. 25, 1860. It is modeled on that of the United States, the legislative power being vested in a Senate and a House of Representatives, the former composed of deputies of the provinces, in the proportion of one for every 30,000 inhabitants or fraction exceeding 15,000, and the latter of representatives nominated by the electoral colleges of the provinces of each department, at the rate of two when the department has two provinces, and one or more for every other two provinces. The parochial electoral colleges choose deputies to the provincial colleges, who in turn send representatives to Congress, and elect the municipal councils as well.

The executive power is intrusted to a President. There are two vice-presidents, who take the place of the president only in case of death or incapacity, and they are elected for four years.

The President has to exercise his executive functions through a cabinet of five ministers, holding office at his pleasure. None of the Presi-

dent's acts have any value without the signature of a minister.

EDUCATION AND RELIGION. Elementary education is compulsory for both sexes, and is free in the public schools that are maintained by the municipalities. High-schools are maintained by the government in the capitals of the departments, and in some provinces pupils pay a moderate fee. There is in Lima a central university, called "Universidad de San Marcos," the most ancient in America; its charter was granted by the Emperor Carlos V; it has faculties of jurisprudence, medicine, political science, theology and applied science. Lima possesses a school of mines and civil engineering, created in 1874, with good collections and laboratories. There are in the capital and in some of the principal towns private high-schools under the direction of English, German and Italian staffs. Lima has also a public library with a rich collection, besides the one of the university and the school of mines. There are two minor universities at Cuzco and Arequipa.

By the terms of the constitution there exists absolute political but not religious freedom, the charter prohibiting the public exercise of any other religion than the Roman Catholic, which is declared the religion of the state. But practically there is a certain amount of tolerance, there being in Callao and Lima Anglican churches as well as Jewish synagogues. At the census of 1876 there were 5,087 Protestants, 498 Jews; other religions, besides Catholic, 27,073.

FINANCE. The budget for 1893 placed the total revenue at \$4,854,718 and the expenditures at \$4,415,316.

Peru has a considerable public debt, divided into internal and external. The internal liabilities (1888) were estimated officially at over \$60,107,850, excluding \$46,060,850 paper money. The outstanding foreign debt is made up of two loans, contracted in England in 1870 and 1872, aggregating \$157,895,400.

No interest has been paid on the foreign debt of Peru (which was held chiefly in England) since 1876. An arrangement was made in 1885 with Chile by which a percentage of the guano deposits should be paid as interest to the bondholders, and a small amount was transmitted to England in 1883; but it was not till January, 1890, that the bondholders' claim was settled by an arrangement with the Chilean government securing certain guano deposits, the estimated value of which is \$11,250,000. The interest arrears of Peru amounted in 1889 to \$114,983,255. In January, 1890, what is known as the Grace-Donoughmore contract was finally ratified. By this the English council of foreign bondholders released Peru of all responsibility for the two loans on condition that the bondholders had ceded to them all the railways, mines and guano deposits of the state for 66 years. The bondholders undertake to extend the existing railways.

DEFENSES. The army of the republic is composed of six battalions of infantry, numbering

2,400 men; of two regiments of cavalry, numbering 600 men; of two batteries of artillery, numbering 500 men; and of a gendarmerie of 2,400 men—forming a total of 5,900 men.

The Peruvian navy now consists of three vessels—one cruiser, one steamer, and one training frigate.

COMMERCE.—The chief crops of the fertile valleys on the coast of Peru are sugar, cotton and grapes. The exportation of sugar amounted to 2,953,000 dollars in 1891. This industry suffered much in 1889 on account of the disastrous war with Chile. Peruvian cotton is chiefly grown in the valleys of the Piura and Ica, and is a perennial. In 1891 the value of the cotton exported from Piura and Ica was \$667,777. The vine has been a profitable industry ever since the Spanish conquest, in several valleys on the coast, and also in the Sierra. Good wine is made at Pisco and Ica, and also a famous spirit from the grape, called *Pisco* and *Italia*. The yearly yield of wine is about 17,600,000 pints, and of spirits 5,280,000 pints. Rice of excellent quality is raised in the coast-valley of Lambayeque, and there are establishments for preparing it at Lambayeque and Ferreñafe. The yearly crop reaches 24,750,000 pounds. Olives are grown in the Tambo Valley near Arequipa; and before the Chilean War, mulberries, silkworms and cochineal were successfully cultivated. The rocky islets and barren deserts of the coast were once a source of enormous wealth to Peru, but are so no more. The exportation of guano from the Chincha Islands began in 1846 and ended in 1872, the supply being exhausted; and the nitrates of Tarapacá were seized and annexed by Chile, as the result of the war.

The staple exports of the Sierra of Peru are silver and wool. The silver-mines extend along the whole length of the Cordilleras, and are worked here and there, the great center of mining industry being at Cerro Pasco. In 1877 the Cerro Pasco mines produced 1,427,592 ounces of silver, and there are others of equal value around Puno, in the south of Peru. In the above year the value of exported silver was \$2,875,000; of copper, \$1,650,000. The number of mines in Peru is on the increase. There were 2,641 silver-mines and 46 gold-and-silver mines reported in 1891.

PUBLIC WORKS. The system of railways consists of a dozen short lines in the coast-valleys—varying in length from twenty to eighty miles, constructed to bring the produce down to the seaports—and of two long lines across the Andes. The first of these, from Callao and Lima to Oroya, in the lofty valley of Jauja, is to be 136 miles long, and was commenced in 1870. It threads the intricate gorges of the Andes by a winding path along the edges of precipices, through tunnels, and over bridges that seem suspended in the air. It tunnels the Andes at an altitude of 15,645 feet, and the bridge of Verugas spans a chasm 580 feet wide, on three piers, the center one being 252 feet high, of hollow wrought-iron. Of this railroad, 86¾ miles had in 1891 been completed, at a cost of \$23,129,435. The other great line across the Andes connects

the port of Mollendo with Puno on the shores of Lake Titicaca, passing by Arequipa. The summit is crossed at a height of 14,660 feet, and the line is 346 miles long.

HISTORY. In August, 1894, a revolutionary movement in opposition to President Cáceres broke out, the chief leading spirit being Señor de Pierola, a former president. After a stubborn war, lasting nearly a year, President Cáceres fled and took refuge on board a French man-of-war, and on July 10, 1895, General Pierola was elected President.

For general article, see **PERU**, Vol. XVIII, pp. 669-679.

PERU, a city of La Salle County, northern central Illinois, at the head of navigation on the Illinois River, and at the terminus of the Illinois and Michigan Canal, 17 miles S. of Mendota, 100 miles W.S.W. of Chicago, and a mile below La Salle, with which it is connected by a car-line, on the Chicago, Rock Island and Pacific and the Chicago, Burlington and Quincy railroads. It is situated in a region in which coal is extensively mined, and has many important industries; among them, zinc-works employing 500 hands, large agricultural-implement factory, foundry, machine-shops, sawmills, breweries, flour-mills and manufacturing of scales, pumps and boilers. The city is lighted by electricity; has two public parks, several churches, schools, a daily and weekly newspaper. Population 1890, 5,550.

PERU, a city and the capital of Miami County, northern central Indiana, 16 miles E. of Logansport and 75 miles N. of Indianapolis, on the Wabash River, and on the Lake Erie and Western and Wabash railroads. It is well laid out, has several churches, a high-school, two national banks with combined capital of \$200,000, two daily, a semi-weekly and two weekly newspapers. It is the trading-center for a rich agricultural district, and has sewing-machine and cabinet works, foundries, railroad-shops, planing-mills, brewery, artificial ice-works, carbon-works, woolen-mills, bagging-mills, carriage factories, and manufactures of baskets and flint-glass. Population 1890, 7,028.

PERU BALSAM. See **BALSAM**, Vol. III, p. 292.

PERUGIA, LAKE OF. See **ITALY**, Vol. XIII, p. 40.

PERUVIAN ARCHITECTURE. See **ARCHITECTURE**, Vol. II, pp. 451, 452.

PERUVIAN BARK. See **CINCHONA**, Vol. V, pp. 780-782.

PERUVIAN INDIANS. See **INDIANS**, Vol. XII, pp. 828, 829; also **PERU**, Vol. XVIII, pp. 676, 677.

PESHITO OR PESHITTA. See **SYRIAC LITERATURE**, Vol. XXII, pp. 824, 825.

PESHTIGO, a village of Marinette County, northeastern Wisconsin, on the navigable Peshtigo River, near Green Bay, 100 miles N.E. of Oshkosh, and on the Chicago and Northwestern railroad. It contains a large number of saw and planing mills, and has a trade in lumber. Population 1890, 1,719.

PESTALOZZI. See **EDUCATION**, Vol. VII, p. 677.

PESTILENCE. See **PLAGUE**, Vol. XIX, pp. 159-168.

PETALISM. See **OSTRACISM**, Vol. XVIII, p. 62.

PETALS OF FLOWERS. See **BOTANY**, Vol. IV, pp. 132-134.

PETALUMA, a city in Sonoma County, northwestern California, on Petaluma Creek, at the head of navigation, 42 miles N.N.W. of San Francisco, with which it has communication by steamer, and by the San Francisco and Northern Pacific railroad. Its location, surroundings and equable climate have combined to make the city an attractive resort for tourists and strangers. It is also well adapted to the cultivation of grapes and other fruit, and the beautiful and fertile valleys of the vicinity are productive and highly cultivated. The city contains several churches, large graded-school buildings, high-school buildings, flouring-mills, planing-mills, sawmills, foundry, brewery, woolen-mill, two daily and three weekly newspapers, and superior warehouse facilities. Fruit, lumber, dairy products and cereals are the chief articles of export. Population 1890, 3,692.

PETASITES. See **HELIOTROPE**, Vol. XI, p. 634.

PETCHORA, a river. See **RUSSIA**, Vol. XXI, p. 73.

PETECHIÆ OR HÆMORRHAGIC SPOTS. See **PLAGUE**, Vol. XIX, p. 160.

PETER, APOCRYPHAL BOOKS OF. See **APOCALYPTIC LITERATURE**, Vol. II, p. 179; and **PETER**, Vol. XVIII, pp. 696, 697.

PETERBORO, a village of Peterboro township, Hillsboro County, southern New Hampshire, on Contoocook River, 18 miles E. of Keene and 33 miles S.W. of Concord, and on the Fitchburg and the Boston and Maine railroads. It contains manufactories of cotton and woolen goods, shoes, thermometers, piano-stools, trusses, etc. Population of the township in 1890, 2,507.

PETERBOROUGH, a town and the capital of Peterborough County, central Ontario, Canada, on the navigable Otonabee River, and on the Grand Trunk and Canadian Pacific railroads, 94 miles N.E. of Toronto. The city is situated in a fertile plain, is well laid out; connected by a fine bridge with Ashburton; has good water-power, and manufactories of leather, woolen goods and agricultural implements, contains foundries, flour-mills, grist-mills, and carries on a shipping trade in grain, pork, lumber and flour. Population 1891, 9,717.

PETERLOO, MASSACRE OF. See **MANCHESTER**, Vol. XV, p. 464.

PETERMANN, AUGUST HEINRICH, a German geographer; born in Prussian Saxony, April 18, 1822. He assisted Professor Berghaus in the preparation of his physical atlas; prepared the maps for Humboldt's *Asie Centrale*; in 1845 went to Edinburgh to superintend the English edition of the *Physical Atlas*; in 1847 went to London,

where he became a member of the Royal Geographical Society, and contributed to the *Athe-naum*, etc. In 1854 he returned to Germany and became director of Justus Perthes' geographical institution in Gotha. In 1855 he began the publication of his celebrated *Mittheilungen*. He was much interested in several African and Arctic expeditions, and in 1876 he visited the United States. He died by suicide in Gotha, Sept. 25, 1878.

PETERS, CHRISTIAN FRIEDRICH AUGUST, a German astronomer; born in Hamburg, Germany, Sept. 7, 1806. He was noted for his valuable investigations of the motions of the fixed stars; was long the editor of the *Astronomische Nachrichten* and director of the Altona Observatory. He published important papers on the parallaxes of the stars, the constant of nutation, etc. He died in Kiel, May 8, 1880.

PETERS, CHRISTIAN HENRY FREDERICK, an American astronomer; born in Schleswig, Germany, Sept. 19, 1813. He graduated at Berlin; traveled for some years, and settled in the United States; became connected with the coast survey, and in 1858 with Hamilton College, where he taught astronomy and had charge of the Litchfield Observatory; was chief of the transit of Venus party to New Zealand in 1874. As director of the Litchfield Observatory, which he brought to a high state of perfection, he recorded more than 20,000 spots on the sun and catalogued some 16,000 zodiacal stars. He made extensive investigations concerning comets, and was known to the general public as the discoverer of a very large number of asteroids. He died in Clinton, New York, July 19, 1890.

PETERS, KARL, a German explorer; born in Neuhaus, Hanover, Sept. 27, 1856; educated at the Universities of Göttingen, Berlin and Tübingen. Having inherited considerable means, he published a work in 1883, entitled *Willenswelt und Weitwille*, which was philosophical in character, and then devoted himself to travel throughout Europe. In 1884 he led a colonization expedition to East Africa under the auspices of the government and gave up his time to colonizing the German territory in Africa, and was made president of the German East African Society. His aggressiveness toward the English led to his recall, but he was permitted to return to aid Emin Pasha in establishing a German colony in equatorial Africa. He met with opposition from the English, who succeeded in having his mission repudiated by Germany. He made his way into the interior, however, in search of Emin Pasha, and met his death in Masailand in September, 1889.

PETERS, SAMUEL ANDREW, an American clergyman; born in Hebron, Connecticut, Dec. 12, 1735. He is chiefly remembered for his satirical *History of Connecticut*, which through his proclivity for falsifying gave rise to widespread misconceptions regarding the Connecticut BLUE LAWS (q.v., in these Supplements), and is the "Parson Peter" of Trumbull's Hudibrastic polit-

ical poem, *McFingal*. He died in New York, April 19, 1826.

PETERS, SAINT, old. See BASILICA, Vol. III pp. 415, 416. New; see ARCHITECTURE, Vol. II, p. 438.

PETERSBURG, a city and the capital of Me-nard County, western central Illinois, on the Sangamon River, 23 miles N.W. of Springfield. It is the center of an agricultural, stock-raising and coal-producing region; has good water-power, and contains tile, bed and mattress and picket-fence factories. There are also medicinal springs near by. Petersburg was laid out by Abraham Lincoln, in 1835. Population 1890, 2,342.

PETERSBURG, a town and the capital of Pike County, southwestern Indiana, near the White River, 20 miles S.E. of Vincennes and 44 miles N.N.E. of Evansville, on the Evansville and Terre Haute railroad. It is the center of a region producing coal, fire-clay, hardwood timber, live-stock, and has brick and tile works, flour and woolen mills and manufactories of lumber. Population 1890, 1,494.

PETERSBURG, a city of Virginia, in 1890 the third city in size in the state. It has communication with other points by the navigable Appomattox River and by the Atlantic Coast Line and the Norfolk and Western railroads. It has numerous churches, high and lower grade public schools, and St. Paul's Female School, the Southern Female College and the Protestant Episcopal school for girls; libraries, state and national banks, water-works, electric lights, street-railways, one weekly, one semiweekly and three daily newspapers and a monthly periodical. The returns for 1890 showed 56 industries reporting in 223 establishments, with a combined capital of \$3,879,151, employing 5,315 persons, to whom was paid \$1,283,612, and having an annual product valued at \$6,876,352. The city is the most important shipping-point for tobacco in the United States, having also a large export trade in cotton, flour and peanuts, and contains extensive tobacco warehouses and factories, cotton, silk, flour and paper mills, and manufactories of heavy machinery and agricultural implements. There are large granite quarries in the vicinity. Population 1890, 22,080. See also PETERSBURG, Vol. XVIII, p. 702; also UNITED STATES, Vol. XXIII, pp. 781-783.

PETERSEN, HALLGRIM, a poet. See ICELAND, Vol. XII, p. 623.

PETERSEN, NIELS MATHIAS. See DENMARK, Vol. VII, p. 93.

PETERS-PENCE OR ROMESCOT, a tax for the benefit of the Pope; thought to have first been levied in England in 721 by Ina, King of Wessex. It was discontinued in 1365, and in 1534 Henry VIII had it prohibited by act of Parliament. Considering the value of money at that period, the levy—which was one penny for each family—was an enormous exaction, as a penny was the price of a day's labor. It has been revived as a voluntary contribution in several countries since the cessation of the temporal power of the popes, and has proven very successful. At the time of

the jubilee of Pius IX in 1877, the sum collected amounted to \$3,300,000.

PETIGRU, JAMES LEWIS, an American lawyer; born in Abbeville County, South Carolina, March 10, 1789. He settled in Charleston, South Carolina, after being admitted to the bar, in 1812, and in a short time stood at the head of the profession in his state. He was a strong believer in the principles of the Federal party, and was a Union leader during the period of nullification. When South Carolina seceded he refused to take part in the work, but still remained loyal to his state, and through his sincerity and ability retained the esteem of his fellow-citizens. He held various positions of public trust, and a short time before his death, in Charleston, March 3, 1863, he completed the codification of the laws of South Carolina, a task to which he was appointed by the state legislature. The bar of Charleston issued a *Memorial* (1867).

PETIOLE. See BOTANY, Vol. IV, pp. 112, 113.

PETION, ALEXANDRE (1770-1818). See HAYTI, Vol. XI, p. 545.

PETIT DE JULLEVILLE, LOUIS, a French historian; born in Paris, July 18, 1841; graduated at the École Normale. After being instructed in the Collège Stanislaus, Paris, he became a professor of letters of Dijon, and became professor in the faculty of letters of Paris in 1886. Among his works, which are best known for dramatic history, are *Histoire du Théâtre en France*; *Les Mystères* (2 vols., 1880); *Théâtre Comique en France au Moyen Âge* (1886).

PETITE ANSE, an island of Iberia parish, Louisiana, containing a remarkable deposit of rock-salt, which was mined by the Confederates in 1862. The work was carried to a depth of 75 feet, but was broken up by the Union forces in 1863. Work has been resumed in recent years.

PETITION OF RIGHT. See PETITION, Vol. XVIII, p. 705.

PETO, SIR SAMUEL MORTON, an English railroad constructor and engineer; born in Woking, England, Aug. 4, 1809. He constructed a large portion of the leading railway works in England, and was engaged in the formation of a large railway in Canada. Among his most important works were the Norwegian Grand Trunk line and the Royal Danish line. Toward the close of 1854 he undertook, without prospect of profit, the construction of a railway from Balaklava, in the Crimea. He was returned as one of the members in the advanced Liberal interest for Norwich in August, 1847, and again at the general election in July, 1852, and retired in December, 1854. He was elected one of the members for Finsbury in April, 1859, and at the general election in July, 1865, exchanged his seat for Bristol, but retired from Parliament in April, 1868, in consequence of the bankruptcy of the firm of Peto, Betts and Crampton, with liabilities of above thirty-five million dollars. He died Nov. 13, 1889.

PETOFI, ALEXANDER, a Hungarian poet and patriot (1822-49). See HUNGARY, Vol. XII, p. 378.

PETOSKEY, a village of Emmet County, northern part of the southern peninsula of Michigan, on Little Traverse Bay, an arm of Lake Michigan, 60 miles N.N.E. of Traverse City, and on the Chicago and West Michigan and the Grand Rapids and Indiana railroads, with steamer communication with lake ports. It has a good water-power from Bear River; manufactures lumber and lime, flour, pulp and handles, and ships lime, maple-sugar and large quantities of fish. Petoskey is a fashionable watering-place and resort for sufferers from asthma and hay-fever. Population 1890, 2,872; 1894, 3,649.

PETRI, LAURENTIUS and OLAUS, brothers. See SWEDEN, Vol. XXII, p. 754.

PETRIE, W. M. FLINDERS, an English Egyptologist; born June 3, 1853, in England. From 1875 to 1880 he was employed in exploring and measuring British earthworks, and in 1880 published *Stonehenge*. The years 1881 and 1882 were spent in Egypt, measuring, surveying and photographing the pyramids and temples of Ghizeh. An account of this expedition was published in 1883. In 1884 he again visited Egypt, this time as explorer to the Egypt Exploration Fund, and excavated the mounds of San, the *Zoar* of Scripture. Mr. Petrie's memoir on *Tanis*, part I, with plans and illustrations, was published by the committee in 1885. He again went out in the same capacity, and discovered the site and ruins of the long-lost Græco-Egyptian city of Naukratis, in the Delta. His third expedition resulted in the discovery of the sites of Am and of Defenneh. On the latter site he discovered the ruins of Pharaoh's house and a palace-fort of remarkable construction. He wrote the article on WEIGHTS AND MEASURES, in this ENCYCLOPÆDIA. In 1888 he published *Historical Scarabs*, 2,220 figures arranged chronologically on 68 pages; also *A Season in Egypt*, with 32 plates, on the rock-inscriptions of Assuan; *Historical Data of the XIth Dynasty*; *Surveys of the Pyramids of Dashur*; *The Earliest Known Column in Architecture Early in the IVth Dynasty*; *Weights Used in Memphis*; etc. In 1889 he published *Hawara, Biahmu and Arsinoë*. He worked for the Palestine Exploration Fund in 1890 and 1891.

PETRIFACTIONS. See MINERALOGY, Vol. XVI, p. 371.

PETROGRAPHY, etymologically, is a description of rocks, but it is so difficult to describe rocks without reference to their structure and geological relations, that specialists are using the term as a branch of geology which has for its object the study of the texture, mineralogical composition and other physical characters of rocks. It is an indoor rather than an outdoor study. See *Physical Properties of Minerals*, under MINERALOGY, Vol. XVI, pp. 372-380.

PETROLEUM V. NASBY, the pseudonym of LOCKE, DAVID ROSS, q. v., in these Supplements. PETROMYZONTIDÆ. See LAMPREY, Vol. XIV, p. 249.

PETROSSA TREASURE. See PLATE, Vol. XIX, p. 182.

PETRUCCI FAMILY. See SIENA, Vol. XXII, p. 42.

PETSH OR IPEK, a pleasant town of European Turkey, in Albania. It stands on the Bistritza, or White Drin, 73 miles E.N.E. of Scutari. Population about twelve thousand, mostly Turks.

PETTENKOFEN, AUGUST VON, an Austrian military and genre painter; born in Vienna in 1823; in 1866 became a member of the Vienna academy, and in 1867 of the Munich academy. His pictures, which generally relate to episodes in peasant-life and the soldier's career in Hungary, are painted with an exactness and truth which manifest not only large genius but an intimate knowledge—based upon his early soldier-life. He was knighted in 1876. Among his works are *After the Duel*, and *Hungarian Peasants Halt*, in the Fedor Museum, Amsterdam; *A Rendezvous*, in the Vienna Museum.

PETTENKOFER, MAX VON, a German chemist; born in Lichtenheim, Dec. 3, 1818; became professor of chemistry at Munich in 1847, and professor of hygiene in a Bavarian University in 1865. Among numerous valuable discoveries that he made are a process of obtaining illuminating gas from wood, and the characteristics of oil-colors. His researches into the factors of the dissemination of cholera have been borne out by recent experience. He was one of the editors of *Zeitschrift für Biologie* from 1865 to 1882, and among other important works are *Ueber die Verlegung der Göttesäcker*, in Basel (1864); *Zum Gegenwärtigen Stand der Cholerafrage* (Leipsic, 1877).

PETTIE, JOHN, a Scotch painter; born in Edinburgh, in 1839; noted for his life-like scenes of old English life. He became a royal academician in 1873, in place of Sir Edwin Landseer. Many of his works have been engraved. Among his noted works are *The Drum-Head Court-Martial*; *Arrest for Witchcraft*; *The Disgrace of Cardinal Wolsey*; and *Jacobites*, 1745.

PETTIGREW, JAMES BELL, a Scotch surgeon and anatomist; born in Roxhill, May 31, 1834. He contributed the article FLIGHT, FLYING-MACHINES, in this ENCYCLOPÆDIA, Vol. IX, pp. 308–323, and of many valuable works on anatomy and other sciences. He is especially famous for his elaborate and intricate investigations in anatomy. He was elected president of the Royal Medical Society in 1860, and was the recipient of many other honors. Among his numerous important works are *The Valves of the Vascular Systems in Vertebrata* (1864); and *The Muscular Arrangements of the Bladder and Prostate* (1867).

PETTIGREW, RICHARD FRANKLIN, an American public man; born in Ludlow, Vermont, July, 1848. He removed with his parents to Evansville, Rock County, Wisconsin, in 1854; was prepared for college at the Evansville Academy, and entered Beloit College in 1866, where he remained two years; was a member of the law class of 1869, University of Wisconsin; went to Dakota in July, 1869, in the employ of a United States deputy as a laborer; located in Sioux Falls, where he engaged in the surveying and real-es-

tate business; opened a law office in 1875; was elected to the Dakota legislature as a member of the council in 1877, and re-elected in 1879; was elected to Congress in 1881 as a delegate from Dakota Territory; to the territorial council in 1884; United States Senator, under the provisions of the act of Congress admitting South Dakota into the Union (1889–95), and again in 1895.

PETUNIA, a South American variety of the nightshade family. See HORTICULTURE, Vol. XII, p. 264.

PEWEE. See PHŒBE-BIRD, in these Supplements.

PEWS. See ARCHITECTURE, Vol. II, p. 469.

PEXOS, a mountain. See CANARY ISLANDS, Vol. IV, p. 799.

PEYER'S GLANDS. See DIGESTIVE ORGANS, Vol. VII, pp. 227, 228.

PEYTON, JOHN LEWIS, an American lawyer; born in Montgomery Hall, Augusta County, Virginia, Sept. 15, 1824; received a military and classical education at Virginia Military Academy, and graduated at the law department of the University of Virginia in 1845. In 1851 he was sent by the government on special service to England, France and Austria. Returning in 1853, he resided in Chicago, where he attained great eminence at the Chicago bar. He returned to Virginia in 1856; raised a company for the Confederate cause in 1861; and broke the Charleston blockade in the Confederate man-of-war, *Nashville*. Went to Europe in 1861 as agent of North Carolina to England and France, and conferred with many leading European statesmen. He wrote *A Statistical Review of the State of Illinois* (1854); *The American Crisis* (1866); *Tom Swindel; or, The Adventures of a Boomer* (1893); and a number of other works.

PFLEIDERER, OTTO, a German Protestant theologian; born in Stettin, Sept. 1, 1839. Studied under Baur, at Tübingen, from 1857 till 1861, and next paid a visit of study to England and Scotland; became pastor at Heilbronn in 1868, and superintendent at Jena in 1870, an office which in the same year he exchanged for the chair of theology there. In 1875 he was called to be professor of systematic theology at Berlin. His works are numerous, and may not be ignored by any serious student of philosophy or theology. The latest published are *The Influence of the Apostle Paul on the Development of Christianity* (1885); and *The Development of Theology since Kant* (1890).

PHACOCHÆRUS, OR WART-HOG. See SWINE, Vol. XXII, p. 774.

PHÆDRA. See THESEUS, Vol. XXIII, p. 294.

PHAËTONIDÆ. See TROPIC-BIRD, Vol. XXIII, p. 588.

PHAGEDÆNA. See VACCINATION, Vol. XXIV, pp. 26, 27.

PHAGOCYTES, lymph corpuscles or leucocytes, which, upon certain inflammatory conditions of the system, devour or absorb bacteria and other noxious substances. Metschnikoff

found that, after the inflammation consequent upon the inoculation of an animal, the bacteria became so mingled with or absorbed by the leucocytes that they were rendered altogether inactive, if not actually destroyed.

PHALANGIDEA. See ARACHNIDA, Vol. II, pp. 277-279.

PHALANGISTIDÆ. See MAMMALIA, Vol. XV, pp. 382, 383.

PHALANX. See ARMY, Vol. II, p. 561.

PHALARIS, EPISTLES OF. See PHALARIS, Vol. XVIII, p. 730.

PHALAROPE. See SAND-PIPER, Vol. XXI, p. 260.

PHALLIC WORSHIP, a practice or custom which originated in a reverence for the generative or reproductive powers of nature, and became debased among semicivilized and ancient people into an adoration of a figure of the phallus or male organ of generation. This practice has prevailed in India in recent times; also among some of the Australasian tribes. It prevailed in Phrygia, Chaldæa, Syria, Egypt, Greece and Rome. Priapus, Pan, Hermes and other gods were worshiped in Rome and Greece through a symbolism of the phallus. See PRIAPUS, Vol. XIX, p. 720.

PHANARIOTS. See GREECE, Vol. XI, pp. 124, 125.

PHANEROGAMIA. See VEGETABLE KINGDOM, Vol. XXIV, pp. 130, 131.

PHARANGOBANCHII, same as LEPTOCARDII. See ICHTHYOLOGY, Vol. XII, p. 695.

PHARAOH'S RAT. See ICHNEUMON, Vol. XII, p. 629.

PHARMACY. (For a general treatment of the subject, see PHARMACOPŒIA, Vol. XVIII, pp. 730, 731.) In the United States the *Pharmacopœia* is, in certain states, issued under the requirement of special law, instead of being under the authority of the general government, as in many European states. What is known as the seventh decennial revision of the *Pharmacopœia* was prepared by a convention of pharmacists, which met in Washington in 1890. It is known as the *Pharmacopœia of the United States of America*; was printed at Philadelphia; became official Jan. 1, 1894; and contains modes of preparing and descriptions of drugs, useful information, formulæ, etc. No country has done more to elevate the standard of pharmacy than the United States. There are numerous schools and colleges of pharmacy—some separate and others in connection with prominent universities—where the student is instructed not merely in chemistry, materia medica and botany, but in physics, animal physiology, toxicology and pharmacology. The Philadelphia College of Pharmacy and the School of Pharmacy of the University of Michigan are good examples. In some states it is required of the applicant for a certificate of pharmacy that he be a graduate of an acknowledged school; in others he must pass an examination before a state board of pharmacy.

PHAROS. See ALEXANDRIA, Vol. I, p. 494.

PHARPAR, a river. See ABANA, Vol. I, p. 4.

PHARSALOS, now FERSALA, anciently a town of Thessaly, about 20 miles S. of Larissa, on the River Enipeus, a branch of the Peneus (now the Salambria), and historically notable mainly for the great battle fought here between Cæsar and Pompey, Aug. 9, 48 B.C. It is now the seat of the episcopal palace and the Metropolitan Church.

PHARYNX. See ANATOMY, Vol. I, pp. 837, 838.

PHASCOGALE. See MAMMALIA, Vol. XV, p. 380.

PHASCOLOMYIDÆ. See MAMMALIA, Vol. XV, p. 383.

PHASEOLUS, a genus. See GRAM, Vol. XI, p. 37; also HORTICULTURE, Vol. XII, p. 283.

PHASIANIDÆ. See POULTRY, Vol. XIX, p. 644.

PHASIS, now called RION, a river. See CAUCASUS, Vol. V, p. 253.

PHEASANT'S-EYE, a plant. See ADONIS, Vol. I, p. 163; also HORTICULTURE, Vol. XII, p. 257.

PHEASANT-SHELL, a name which collectors apply to the bright-colored shells of the gastropod mollusk, *Phasianella*, which belongs to the family of top-shells (*Trochidae*). They are found near the shores of tropical seas, especially in Australia.

PHELPS, a village of Ontario County, western central New York, 8 miles N.W. of Geneva, on the New York Central and Hudson River and the Lehigh Valley railroads. It contains important manufactories of machinery, malt, peppermint and other essential oils, and has valuable deposits of gypsum. The village was founded by Oliver Phelps, born in Windsor, Connecticut, in 1749; died in Canandaigua, New York, Feb. 21, 1809. Mr. Phelps received large grants of land in western New York; opened at Canandaigua what is said to have been the first land-office in America; invented the system of townships and ranges now in use by government surveyors; was active as a promoter of the Erie and Welland canals; with several other men purchased in northern Ohio a large tract of land known as the "Western Reserve"; and during his career held many positions of trust. Population 1890, 1,336.

PHELPS, AUSTIN, an American clergyman and author; born in West Brookfield, Massachusetts, Jan. 7, 1820; studied at New Haven and Andover; pastor of Pine Street Congregational Church, Boston (1842-48); Bartlett professor of sacred rhetoric in Andover Theological Seminary (1848-69), and was its president from 1869 to 1879. The degree of D.D. was conferred upon him by Amherst in 1856. Among his numerous works are *New Birth* (1867); *Solitude of Christ* (1868); *Theory of Preaching* (1881); *English Style in Public Discourse* (1883); *My Study* (1885). He died in Bar Harbor, Maine, Oct. 13, 1890.—His wife, ELIZABETH STUART, born in Andover, Massachusetts, Aug. 13, 1815, was a daughter of Professor Moses Stuart, of Andover. She began early in life to write tales of New England life,

under the pen-name of "H. Trusta." These stories were very popular. She married in 1842. Among her publications are a description of life in a country parsonage, entitled *Sunny Side* (Andover, 1851), which had been rejected by several publishers, but reached a sale of 100,000 the first year; *A Peep at Number Five* (1851). After her death appeared *The Tell-Tale* (1852); *Little Mary* (1853); *Last Sheaf from Sunnyside*, with a memorial by her husband (1853). She died in Boston, Massachusetts, Nov. 30, 1852.—For their daughter, ELIZABETH STUART, see WARD, in these Supplements.

PHELPS, EDWARD JOHN, an American jurist; born in Middlebury, Vermont, July 11, 1822;



E. J. PHELPS.

graduated at Middlebury College in 1840; studied at Yale law school; admitted to the bar and began practice at Middlebury in 1843. In 1851 he was appointed second comptroller of the United States Treasury. In 1881 he became professor of law at Yale, and in April, 1885, he was appointed minister to Great

Britain by President Cleveland. In 1888 he contributed to the *Nineteenth Century* a series of articles on *The Constitution of the United States*. In 1893 he was engaged as one of the counsel on the Bering Sea question (q.v.).

PHELPS, ELIZABETH STUART. See WARD, in these Supplements.

PHELPS, JOHN WOLCOTT, an American soldier; born in Vermont, in 1813. He graduated at West Point; served in the Florida, Mexican and Civil wars; became brigadier-general, and accompanied General Butler's expedition to New Orleans; armed the negro slaves as soldiers; was declared an outlaw by the Confederate government; was not sustained by the United States government, and resigned his commission. When the negroes were finally armed by the government, a major-general's commission was offered to him, but declined. He became vice-president of the Vermont Historical Society in 1863; president of the Vermont State Teachers' Association in 1865; was active in the anti-Masonic movement, and was the candidate of the American party for President in 1880. He published a *History of Madagascar* (1884); *Fables of Florian* (1888); *Sibylline Leaves* (1853). He died in 1885.

PHELPS, WILLIAM WALTER, an American public man; born in New York City, Aug. 24, 1839. He graduated at Yale College in 1860, and at Columbia law school in 1863, and arose to eminence in the practice of law. In 1872 he was elected to Congress from New Jersey, and became at once a prominent and active debater. Although a Republican, he voted against the Civil Rights Bill on the ground of unconstitutionality, which cost him his re-election. In 1881

he was sent as minister to Austria by President Garfield. He resigned upon the change of administration in 1882, returning to New Jersey, where he was immediately re-elected to Congress. He was appointed minister to Germany by President Harrison in 1889, which post he occupied until 1893. He died in Englewood, New Jersey, June 16, 1894.

PHENACETINE, a derivative of acetanilide or antifebrine, which it resembles in its medical properties, and is accordingly used as an antipyretic and analgesic.

PHENIC ACID AND PHENOL, same as CARBOLIC ACID, Vol. V, p. 85.

PHENICINE OR PHENICIENNE. See CARBOLIC ACID, Vol. V, p. 86.

PHENIX, a village of Kent County, central Rhode Island, 14 miles S.W. of Providence, on the Pawtuxet River, and on the New York, New Haven and Hartford railroad. It has manufacturing of cotton goods and machinery. Estimated population 1895, 1,500.

PHENOL COLORS. See CARBOLIC ACID, Vol. V, pp. 85, 86.

PHENOLS, aromatic hydroxides, though the name is often given to the simplest phenol, carbolic acid in common parlance. This was discovered by Runge in 1834, in coal-tar, from which it is still obtained. It is a white, crystalline solid, turns red on exposure to air, has a characteristic smell and taste, is somewhat soluble in water but more easily in alcohol, is poisonous, is a good antiseptic, and is used as such in medicine. It is also used to preserve timber, to make picric acid, etc. See CHEMISTRY, Vol. V, pp. 563, 564.

PHENYLAMINE. See ANILINE, Vol. II, p. 47.

PERÆ. An old name for the town of KALAMATA, q. v., Vol. XIII, p. 826.

PHIGALIAN MARBLES. See PHYGALIA, Vol. XVIII, pp. 735, 736.

PHILADELPHIA. Since the article on PHILADELPHIA—see Vol. XVIII, pp. 736-741—was published in this ENCYCLOPEDIA, the city has passed under a new form of municipal government. The present government charter was created by what is known as the "Bullitt Act," 1885, and is a distinct effort to solve the problem of city government by concentrating the power in the hands of an executive who should appoint his chief subordinates and be able to hold them responsible for the manner in which they executed their duties. Prior to this time, the functions of the mayor were chiefly clerical, and those of a director of police. Under the Bullitt Act, the public, municipal business is divided into three departments: one of public safety, which has control of the police, fire and electrical organizations, health, building-inspection and municipal property, and boiler-inspection; the department of public works has supervision of gas, railways, street-cleaning and lighting, surveys and water-supply; the department of charities and correction is under a president and four directors. The mayor appoints the chiefs of all these departments, and they are re-

sponsible to him for the efficiency of their subordinates.

The receiver of taxes and the city solicitor are chosen in the spring, for a term of three years. The city treasurer and city comptroller are county officers, elected in the autumn, for three years—a distinction being made between the county and municipal governments. Under the new system the only conspicuous official malfeasance has been in the office of city treasurer, under whom in 1891 an embezzlement of \$1,500,000 took place, for which he suffered an imprisonment of five years, being pardoned out in 1896.

Under the new charter there has been a marked improvement in public administration. The mayors have been selected with more care; there has been less room for political "log-rolling," and in the difficult problem of American municipal government



STATE HOUSE, PHILADELPHIA, IN 1775.

Philadelphia has become a type of efficiency and probity. The board of education, which has a sort of supervision over the 37 ward or sectional boards of school directors, is still appointed by the court of common pleas, one member being appointed for each of the different city wards. The sinking-fund and park commissions are controlled by boards, one of whom is the mayor, *ex officio*. The Public-Building Commission is an independent organization, created by the legislature in 1870 for the sole purpose of erecting the expensive and long unfinished city hall. It is free from the control of the councils, and practically without amenability to any authority.

The city and common councils are charged with the legislation of the city. There is one select-councilman for each of the 37 wards, who holds office for three years. There is one common-councilman for every two thousand names on the canvassers' lists at the time the election is held. There are 12 judges of the district-court, as the county court in Philadelphia is termed; four judges of the orphans' court, who perform the functions of surrogate and probate judges; and 28 police magistrates. The city is entitled to 8 members of the state senate, 39 members of the state house of representatives, and five members of the House of Representatives in Congress.

Under the operation of the Brooks Law regulating the sale of intoxicating drinks (see LIQUOR



LIBERTY BELL.

LAWs, in these Supplements), there has been a great diminution in the number of arrests for disorderly conduct and other crimes growing out of intoxication. The sale of liquor after midnight and on Sunday is as thoroughly suppressed as such offenses can be under a democratic form of government. There are no recognized evasions of the law, and during prohibited hours it is almost impossible to obtain liquor.

FINANCES. In 1894 the city debt amounted to \$54,275,444, which was offset by securities in the sinking-fund of \$24,830,363 and by other assets, such as cash on hand and outstanding taxes, amounting to \$11,196,198. For the balance, the city has improved and other real estate appraised at about \$46,000,000. The assessed valuation of the city for tax purposes is estimated at two-thirds of the actual value, and amounts to \$780,000,000, on which the tax-rate for many years has been 1.85 per cent. The receipts of the city from all sources were (1895), in round numbers, \$31,000,000, and the expenditures \$28,500,000.

There are 44 banks in the city, of which three are under state charters, having a capital of \$24,000,000 and deposits of \$120,000,000. In addition, 42 trust companies, with a capital of \$30,000,000 and deposits of nearly \$70,000,000, do a large business on collateral stock and bond loans. The \$53,000,000 deposited in the four savings banks represent but a small part of the prudential savings of the people. The function performed by savings banks in New England is very largely replaced in Philadelphia by the building and loan associations, which had their origin in the United States in this city. There are 450 of them in Philadelphia, in annual receipt of more than five millions of dollars and holding in unliquidated bonds and mortgages over forty millions of dollars. The usual term for the expiration of a series in one of these building associations is 11 years and 5 months, but as each year they make a new series they are practically perpetual-loan companies. A very large part of the city has been built up within the last fifty years through the operations of these companies, which loan only to their own members and invest chiefly in real-estate securities offered by the borrowers. The operation of these societies will explain the vast proportion of small dwellings and the ownership by their occupiers which characterizes this city.

MANUFACTURES. Until the census of 1890 Philadelphia claimed pre-eminence over all the cities of the Union for the variety and number of its manufacturing establishments, and for the value of their output. That census transferred this pre-eminence to New York, but the difference was not great. According to its returns there were 18,166 manufacturing establishments reported, having a direct

investment of \$375,250,000, and hiring property valued at \$64,000,000. The aggregate number of employees was 260,000, in round numbers, to whom was paid \$136,000,000 in wages. The value of the products placed upon the market was \$577,250,000.

The chief of these industries, in the order of the products, were: Sugar and molasses, \$46,600,000; clothing, \$34,600,000; foundries and machine-shops, \$29,600,000; printing and publishing, \$25,000,000; carpets and rugs, \$22,000,000; woollens, \$22,000,000; carpentering, \$17,250,000; slaughtering and meat-packing, \$16,000,000; hosiery and knit-goods, \$15,000,000; worsted goods, \$14,750,000; leather goods, \$13,700,000; newspapers and periodicals, \$13,400,000; boots and shoes, \$12,000,000; cotton yarns and fabrics, \$11,500,000; malt liquors, \$10,500,000; chemicals, \$9,700,000; iron and steel, \$9,400,000; tobacco goods, \$9,100,000; petroleum oils, \$8,650,000; silk, \$8,000,000; painting and paper-hanging, \$7,000,000; plumbing and plumbing-supplies, \$6,800,000; umbrellas and canes, \$5,750,000; paints, \$5,200,000; confectionery, \$5,000,000; furniture, \$4,800,000; lumber-mill products, \$4,800,000.

Experts estimate that the increase of manufactures, and of capital and of employees engaged in them, has been thirty per cent in the five years following the census.

A wider renown has undoubtedly come to Philadelphia from the construction of steamships on the Delaware than from any other single industry. This is due not only to the extent of the tonnage built, but to the superb technical achievements of the Cramps. Their yard is located on the Delaware River, in the old Kensington district. The works were founded in 1830, since which time 300 ships have been built. A number of these are the cruisers of the United States navy, as the *Newark*, *New York*, and *Philadelphia*, and the battle-ship *Indiana*, completed in 1896. Here, too, were constructed the *St. Louis* and *St. Paul* for the International Navigation Company, an American line chiefly owned in Philadelphia, but the vessels plying between New York and Southampton. These vessels have a measurement of 11,000 tons and develop 19,000 horse-power.

COMMUNICATIONS. The Delaware and Raritan canal, having fallen under the control of the Pennsylvania Railroad Company, has become simply a financial auxiliary to its interests. By steam navigation Philadelphia has communication with the towns on the Delaware from Trenton to Cape May, and through the Delaware ship-canal to Baltimore and the Chesapeake waters. Surveys have been made at a cost of \$100,000 to the city for a ship-canal across New Jersey to Newark Bay, having a capacity to pass through it modern vessels of large tonnage, and if the general government will assist, capacity for its cruisers and battle-ships. Should the Delaware ship-canal be enlarged to similar proportions, it would be possible to concentrate men-of-war at any point from Norfolk to New York harbor without going to sea.

The harbor itself has recently been greatly improved, partly at the expense of the United States government and partly that of the city. The two islands that lay in the river opposite Camden, known

as Ridgeway Park and Windmill islands, were entirely dredged away in 1894. The city appropriated \$500,000 for improving the channel in the lower reaches of the river, and \$150,000 for widening Delaware Avenue, which is the street on the Delaware River front. In addition to this, \$1,000,000 from the Girard estate was available for this purpose. It is proposed to extend the wharf-line of the city, and also to improve the Camden front, so as to reduce the width of the river from half a mile to 1,900 feet. The currents of the river thus contracted would maintain a depth of 26 feet at low tide. It is estimated that 25,000,000 cubic yards of



CITY HALL, PHILADELPHIA.

material will need to be dredged away, at a cost of \$3,500,000, of which, in 1896, one third had been removed.

Entrance by railroad into the city is now practically confined to the four great systems, the Pennsylvania, the Reading, the Baltimore and Ohio, and the Lehigh Valley, which have absorbed all the other lines. The passage of the Baltimore and Ohio trains is through depressed ways along the banks of the Schuylkill. The Pennsylvania and Reading lines reach the heart of the city in Market Street, near Broad, on elevated causeways of masonry and iron. Their terminal depots are buildings of high architectural beauty and most convenient and sumptuous in their appointments. The station of the Pennsylvania Company confronts the new city hall, has a granite basement story and a superstructure of ten stories in brick, with terra-cotta trimmings, and is a fine adaptation of the Gothic to modern needs. It has a frontage of 306 feet, while the train-shed is 600 feet long and spans a clear distance of 304 feet. The area covered by the shed is about five acres, and 16 tracks enter it side by side. The Reading terminal at Twelfth and Market streets is built of New England granite up to the second floor, above which rise seven stories constructed of pink-tinted brick and white terra-cotta embellishment. In style it is a composite Renaissance. The train-shed is 507 feet in length and 266 feet wide, covered by a roof of a single span.

HOTELS. The somber monotony of Philadelphia buildings began to be changed rapidly at the time of the Centennial Exposition in 1876, and a new appreciation of architectural beauty has controlled recent constructions. In nothing is this more evident than in the new hotels, which show a decided tendency to locate themselves near the center of Broad Street. To the long-renowned Continental Hotel, the Girard House and Bingham's, have been added the Colonnade, of white marble, at the corner of Chestnut and Broad; the Lafayette, in its rear, which was enlarged, renovated and reopened in 1896; the Stratford, still farther south; and the Walton, of brownstone and red brick, opened in February, 1896. These hotels are distinguished for their quiet sumptuousness and elegance and the excellence of their interior decorations.

WATER-SUPPLY. The water-supply of the city is still drawn almost wholly from the Schuylkill River. There are supplementary reservoirs of large dimensions for high service at East Park, Mt. Airy and Roxborough. These, with ten other reservoirs, have a total capacity of 1,017,250,000 gallons.

STREETS. With considerable rapidity the old cobblestone pavements are disappearing from the denser part of the city, and are not extended into the new part. There are 13,000 miles of streets laid out, of which 80 are paved with asphalt, 50 with vitrified brick and 220 with Belgian blocks. Nearly every thoroughfare of importance in the city is traversed by lines of trolley-cars. Since 1890 all the traction cable-roads have been converted into the new electric system, and the old horse-cars have entirely disappeared. The various systems of street passenger traffic were consolidated into one in 1895, the capitalization of which is over \$100,000,000. By a system of exchange tickets, for the purchase of which 3 cents is added to the regular fare of 5 cents, one can be transported to any part of the city and may ride a distance of 14 miles. In January of 1896 the drivers and conductors of this great system struck for ten hours' work, a pay of two dollars a day, and to resist the dismissal of union men without cause. The strike was accompanied with some rioting near the car-stables and in the thoroughfares of Chestnut and Market streets, which confined itself to the destruction of cars. For several days street traffic was entirely arrested, but through the intervention of a committee of citizens a compromise was brought about and the old men were taken back, except in so far as their places had already been supplied by new men.

SCHOOLS. In 1895 there were 425 public schools in the city, with 3,161 teachers and an enrollment of 163,707 pupils. The school system was maintained that year at an expense of \$3,965,571. There are four high-schools, of which two are for girls and two for boys. One of the girls' high-schools is a normal school. Both are fine and massive structures, capable of accommodating 1,200 pupils. Both are on Spring Garden Street, about four squares apart. The Central High School for lads, at the corner of Broad and Green, long occupied a large brick structure, but in 1896 a substantial and handsome building was in process of erection opposite the

old structure. Another graduating-school for boys is known as the Manual Training School, where technical instruction in wood and iron work is given in connection with a curriculum quite as extensive as that of the Central High School, which, with the exception of languages, is intended to be the equivalent of an ordinary collegiate course.

The school administration is a dual system; each ward elects 12 directors or trustees, who have control of the engagement of teachers and questions of discipline. Over them all is a board of education, appointed by the judges of the court already mentioned. This board makes appropriations for the erection of school-buildings and assigns their location, purchases the school-books, and has an advisory relation with the ward or sectional directors. In 1883 this board called to the service of the city James McAllister, of Milwaukee, who succeeded in giving unity to the administration and introducing the system of manual training. Upon his retirement his methods still remained prevalent throughout the system, and the schools of Philadelphia have now become typical for their methods and excellence.

Among the additions of private philanthropy to the educational features of Philadelphia must be noted the Williamson Trade School, resting upon a foundation of \$5,000,000 provided by I. V. Williamson. It is located near Media, in Delaware County, but its control is in Philadelphia and its facilities are offered freely to the children of that city. Of more note is the Drexel Institute, in West Philadelphia, near the Schuylkill River, founded by the banker Anthony J. Drexel. The building has a fine architectural effect, is constructed of buff brick, with light terra-cotta trimmings. It is about two hundred feet square. The interior consists of a central court open from the roof to the ceiling, with galleries at each story leading to the various rooms, and a superb staircase by which the galleries are reached. The purpose of the school is to give instruction in various branches of manual industry, and is maintained by the income of an endowment fund of one million dollars.

In 1891 the city councils ordered free libraries to be established throughout the city, under the direction of the board of education. These are for the circulation of books, and are free. There were six branch libraries in 1896, scattered in different parts of the town, having about 64,000 volumes. The beneficence of Henry Charles Lee enabled the old Philadelphia Library to extend its building and double its capacity. It is a substantial but plain brick building, at the corner of Locust and Juniper streets, enriched by collections that have been accumulating for 160 years, and is now in possession of 180,000 volumes.

Among the institutions for special purposes are the Philadelphia Historical Society, the College of Physicians and Surgeons, the Academy of Natural Sciences, at Nineteenth and Race streets, and the Franklin Institute, on South Seventh Street. All of these institutions have extensive libraries concerned with their specialties. The Academy of Natural Sciences, of green sandstone, is a handsome build-

ing devoted to researches in natural history, and is richly equipped with zoölogical and botanical specimens. It is one of the most vigorous of learned societies in the United States.

The population of Philadelphia according to the census of 1890 was 1,046,964; estimated by the vote cast at the Presidential election in 1896 it would be 1,280,000.

PHILADELPHIA COMMERCIAL MUSEUM. See COMMERCIAL MUSEUM, in these Supplements.

PHILÆ, an island. See EGYPT, Vol. VII, pp. 783, 784.

PHILBRICK, JOHN DUDLEY, an American educator; born in Deerfield, New Hampshire, May 27, 1818. Graduating at Dartmouth in 1842, he taught in Boston for ten years, then was principal of the normal school at New Britain, Connecticut, for two years, and Connecticut superintendent of schools for a similar period; was superintendent of Boston schools for 21 years, from 1857, with the exception of 1875, in which year he was agent of the Massachusetts Board of Education, of which he was for ten years a member; while superintendent of Boston schools in 1873 he was Educational Commissioner of Massachusetts to the Vienna Exposition of that year, serving as a member of the international jury. In 1878 he was United States Commissioner of Education and member of the international jury at Paris, receiving the decorations of the Cross of the Legion of Honor and the gold palm of the University of France. He was also president of state educational associations in Massachusetts and Connecticut, of the American Institute of Instruction and of the National Teachers' Association. He edited the Connecticut *Common School Journal* and Massachusetts *Teacher*; was author of more than forty useful school reports, including *The School Systems in the United States* (1885), and was the originator of the "Quincy System" of public instruction. He died in Danvers, Massachusetts, Feb. 2, 1886.

PHILELPHO. See FILELFO, FRANCESCO, Vol. IX, pp. 161, 162.

PHILIDOR, FRANÇOIS. See CHESS, Vol. V, p. 601.

PHILIP, KING, an American Indian chief sometimes called Pometacon, or Metacomet. He was the younger son of Massasoit (q.v., in these Supplements), and succeeded to the chieftainship of the Wampanoags or Pokanoaets, upon the death of his brother Alexander, in 1662, and renewed treaties with the colonists. In 1675 he began the war called "King Philip's War," in which more than six hundred colonists were killed and 13 towns completely destroyed before Philip's death at the hands of Captain Benjamin Church, in a swamp near Mount Hope, Rhode Island, Aug. 12, 1676.

PHILIP, LANDGRAVE OF HESSE. See LUTHER, Vol. XV, p. 80, et seq.

PHILIPPEVILLE, the ancient Rusicada, a thriving town and seaport of Algeria, in the province of Constantine, 40 miles N.N.E. of the city of that name, on the Gulf of Stora, between Cape Boujaron and Cape de Fer. In the vicinity are quarries of the famous Filfila marble, and also iron-mines. The vine is extensively cultivated, and the town has

a distillery, tanneries and manufactures of cork and cork articles. A harbor has recently been constructed. Population, 15,800.

PHILIPPICS. See DEMOSTHENES, Vol. VII, pp. 69-71.

PHILIPPINE ISLANDS constitute a Spanish colony, in the Malay Archipelago, for a general article on which, see Vol. XVIII, pp. 748-753.

The amounts of the chief products in 1893 were: Hemp, 97,787 tons; sugar, 261,686 tons; coffee, 307 tons; copra, 11,525 tons; tobacco leaf (exported), 230,616 quintals; cigars (exported), 138,438,000; indigo, 940 quintals. The total value of exports in the same year was \$30,500,000 (Mexican money). The total value of imports was \$25,000,000, consisting chiefly of rice, flour, wines, dress, petroleum and coal. About 34 per cent of the imports were from Great Britain, 21 per cent from Hong Kong and Amoy, 13 per cent from Spain and 10 per cent from British India and Singapore. In 1893, 359 vessels of 392,373 tons entered, and 355 vessels of 405,682 tons cleared from the ports of Manila, Iloilo and Cebu. In 1894, 87 vessels of 117,529 tons entered at Iloilo and Cebu. The once rich trade possessed by the islands has been destroyed, and the failure is stated to be due to the niggardly fiscal system, the restrictions on foreign shipping and the abandonment of the natives to the control, spiritually as well as temporarily, to the priests.

The population of Manila, the capital, was, in 1887, 154,062. There are 720 miles of telegraph in the islands and 70 miles of railway.

The army, composed of seven regiments of infantry and one of cavalry, is entirely composed of natives, with the exception of two Spanish batteries of artillery and a corps of engineers. There is a small navy, the most serviceable and characteristic vessels being the feluccas of the coast-service.

In 1894 the Malays manifested great hostility to the Spanish authorities, and several conflicts occurred. Lepanto, the Spanish military station, was taken and sacked March 30th, but the insurgents were defeated on their retreat. It is supposed that the rising was due chiefly to Japanese interference. An outbreak occurred May 24th. Again, in 1895, the Malayan Mahomedans in Mindanao were defeated by the Spanish troops, under General Parrado, March 10th, the Sultan and his son being among the killed. In 1896 the natives were again overcome by the Spanish November 3d, near Las Tinas, and also on the 10th of the same month at Noveleta. At the latter place the Spanish troops gained a "brilliant victory" after desperate fighting.

PHILIPPOTEAUX, FELIX EMMANUEL HENRI, a French artist; born in Paris, April 3, 1815. He is famous for his historical and battle paintings, including *Louis XV Visiting the Battlefield of Fontenoy*, now at the Luxembourg; *The Last Banquet of the Girondins*, at the Museum of Marseilles; and *The Siege of Paris*, a cyclorama. He also made many designs for illustrated publications. He died in Paris, Nov. 8, 1884.—His son, PAUL PHILIPPOTEAUX, a French historical painter; born in Paris in 1846. He assisted his father in preparing the *Cyclorama of the Siege of Paris*, and made a similar representation

of the *Battle of Gettysburg*, which has been exhibited in New York, Chicago, Philadelphia, and other cities. In 1888 he exhibited a series of thirty large paintings illustrating the career of General Grant.

PHILIPS, FRANCIS CHARLES, an English novelist and dramatist; born in 1849. He was educated at Brighton College and the Royal Military College, Sandhurst, whence he entered the Second Queen's Royal Regiment, where he remained until January, 1884, when he was called to the bar. Aside from those he has written in collaboration with Percy Fendall and C. J. Wills, his principal novels are *The Dean and His Daughter* (1887) and *As in a Looking-Glass* (1885), the latter having been published in every capital in Europe. Among his plays are *The Dean's Daughter*, founded on his novel *The Dean and His Daughter*, the play being written in collaboration with Sydney Grundy; *Godpapa*, written with Charles Brookfield; and *The Burglar and the Judge*, also written in collaboration with Brookfield. As a practicing London barrister Mr. Philips appeared in some important cases.

PHILIPSBURG, a borough of Center County, central Pennsylvania, on the Moshannon River, 20 miles N. of Tyrone and 38 miles N.E. of Altoona, and on the Altoona and Philipsburg Connecting, the Beech Creek and the Pennsylvania railroads. It is the center of the bituminous coal region, there being 22 large collieries in the vicinity; is also the trade and shipping center for an agricultural and lumber district, and has saw-mills, furniture factories, and manufactures of fire-brick. Contains a number of factories, mills and machine-shops. Population 1890, 3,245.

PHILIP THE BOLD and PHILIP THE GOOD. See BURGUNDY, Vol. IV, p. 536.

PHILISTOS, a Greek historian. See SICILY, Vol. XXII, p. 19.

PHILLIMORE, SIR ROBERT JOSEPH, an English jurist; born in London, Nov. 5, 1810. He was educated at Westminster, and at Christ Church, Oxford, graduating in 1831; was called to the bar in 1841, and held successively many high legal offices, including those of judge of the High Court of Admiralty, judge of Arches (1867-75), and justice of the High Court of Justice, probate and admiralty division (1875-83). He was a member of Parliament (1853-57); was made a knight in 1862, and was created a baronet in 1881. Among his most important works are *Commentaries on International Law*; *Ecclesiastical Law of the Church of England* (1876); and *Memoirs and Correspondence of George, Lord Lyttleton* (1883). He died Feb. 4, 1885.—His brother, JOHN GEORGE PHILLIMORE, also an English jurist and author; born in Oxfordshire, England, in 1809. He was educated at Westminster School, and at Christ Church College, Oxford, and was called to the bar in 1832. He became a jurist of eminence, and in 1851 queen's counsel, and professor at the Middle Temple. He was a member of Parliament in 1852. His most important works were *An Introduction to the Study and History of the Roman Law* (1848); *Private Law Among the Romans* (1864); *Principles and Maxims of Jurisprudence* (1856); and began, also, the publication of a

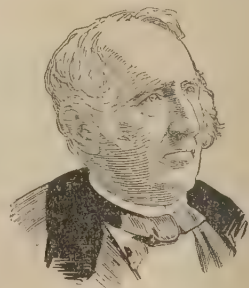
history of the reign of George III. He died in Shiplake House, Oxfordshire, April 27, 1865.

PHILLIPS, ADELAIDE, an English contralto singer; born in Stratford-on-Avon, England, Oct. 26, 1833. She began singing in public when but nine years of age, was encouraged by Jenny Lind to study abroad, and at twenty made her first operatic appearance in *Semiramide*. Her voice was of unusual compass. Her last appearance was in Cincinnati, in 1881. She died Oct. 2, 1882, in Carlsbad, Germany.

PHILLIPS, LAWRENCE BARNETT, a British inventor and painter; born in London, Jan. 29, 1842. He was educated at Dr. Pinches' school, and by tutors at his father's residence. In 1861 he started in business as a wholesale watch and chronometer manufacturer, having invented that form of keyless work which has now been adopted by all English manufacturers. After 1861 he constructed some of the most complicated and highly finished specimens of the horological art, and by the invention of various forms of mechanism did much toward the simplification of chronographs and calculating-machines. He published his *Autographic Album* in 1866, his *Horological Rating Tables* in 1871, and *A Dictionary of Biographical Reference* in 1873. In November, 1865, he was elected a fellow of the Royal Astronomical Society, and in March, 1885, a fellow of the Society of Antiquaries. After retiring from business in 1882, he occupied himself as a painter and etcher, being a constant exhibitor at the Royal Academy and the leading London and provincial exhibitions, and was elected an associate of the Royal Society of Painter-Etchers.

PHILLIPS, PHILIP, an American composer and singer; born in Chautauqua County, New York, Aug. 13, 1834. He published *Musical Leaves* (1862); *The American Sacred Songster* (1868); *Song Pilgrimage Around and Throughout the World* (1880). He sang at religious revivals and with evangelists. His collections of song were numerous and captivated the popular ear.

PHILLIPS, WENDELL, an American orator and abolitionist; born in Boston, Nov. 29, 1811. He was with Charles Sumner and J. L. Motley at Harvard, where he graduated in 1831. He studied law at the Cambridge Law School under Justice Story, and was admitted to the bar in 1834, when he entered the office of Thomas Hopkinson, in Lowell, Massachusetts, where he made the acquaintance of Benjamin F. Butler. In 1835 he opened an office



WENDELL PHILLIPS.

for himself in Boston. At Greenfield, in 1836, he married, Oct. 12, 1837, Miss Ann Terry Greene, through whom he became acquainted with Garrison. Though she survived him more than a year, she was always an invalid, yet a cheerful one, and it was to her influence that Phillips ascribed the great and decisive impulses of his life. At a meet-

ing held at Faneuil Hall, Dec. 8, 1837, to mildly denounce the murder of E. P. Lovejoy (q.v., in these Supplements), Phillips made his first great speech as an abolition orator, surprising the assembly with an address so solemn, so unanswerable, and withal so captivating, that it gave way to the power of the speaker and adjourned with an almost unanimous approval of the denunciatory resolutions that had been proposed by Dr. W. E. Channing (q.v., Vol. V, p. 393). Phillips had already begun to appreciate the estrangement of Boston society on account of his abolition sentiments, and this Faneuil Hall speech completed it. His clients abandoned him; but, having a competency through his inheritance and that of his wife, he was enabled to give himself up to the promotion of the antislavery cause. He also delivered lyceum lectures, from which he derived a considerable income, giving his lecture on "The Lost Arts" over two thousand times, and receiving therefor \$150,000. In 1839 he became general agent of the Massachusetts Antislavery Society,—a position entailing expense, and bringing no pecuniary return. In the following year he attended the World's Antislavery Convention in London, but, failing to secure the reception of a number of women delegates to this convention, he withdrew, thus dividing the abolition forces in America, Garrison and Phillips, however, remaining firm for the equality of women. Having formed a personal friendship with O'Connell, Phillips became deeply interested in the emancipation of the Catholics of Ireland. As a result of the case of the mulatto fugitive, Latimer, who was refused trial by jury by Judge Shaw in Boston, Phillips made an exhaustive study of the constitution of the United States and concluded that it was the palladium of slavery, forthwith denouncing that instrument and demanding a dissolution of the Union. He was the foremost champion of the Massachusetts Personal Liberty Bill in 1855. He was opposed to the annexation of Texas, to the Mexican War and to the compromises of 1850, seeing in all these the encroachment of the slavery idea. He did not cease to urge the separation of the free from the slave states until the firing on Fort Sumter, when he foresaw that the Civil War must end in the destruction of slavery. Then he announced his changed purpose and aided in every way the cause of the Union. In 1865 Mr. Phillips became the president of the American Antislavery Society, and used his influence to secure the rights of citizenship to the freedmen. When this was accomplished by the passage of the Fifteenth Amendment, in 1870, he became a leader of the Labor party, proclaiming the emancipation of workmen to be the next great cause to be pressed to a solution. He also favored the doctrines of the Greenback party. His last public oration was an address at the unveiling of a statue to Harriet Martineau at the Old South Church, Boston, Dec. 26, 1883. Then he began to fail rapidly in health, and died in Boston, Feb. 2, 1884.

PHILLIPS ACADEMY, the name of two non-sectarian institutions, one at Andover, Massachusetts, and the other at Exeter, New Hampshire. The former was organized and founded by Judge Samuel Phillips, Jr., with the aid of his father, and of his uncle, John

Phillips (1719-95), opening the school April 30, 1778, with thirty pupils. The school was chartered in 1780, and in 1807 "the class in theology" became the Andover Theological Seminary. Under Cecil F. P. Bancroft as principal, there were 16 instructors and an average attendance of about 475. The school occupies twenty buildings, valued at \$100,000, including dwelling-houses, dormitories, a large academy hall, a chemical laboratory and a gymnasium. There is also a library of 3,300 volumes. The endowment of the academy is \$250,000.—PHILLIPS EXETER, also an English and classical school for boys, is at Exeter, New Hampshire, and was founded in 1781 by John Phillips, opening May 1, 1783. Under Charles Everett Fish, as principal, there are 10 instructors and an average attendance of 250 pupils. The school occupies buildings valued at \$100,000, including a physical laboratory, a chemical laboratory and a large gymnasium. There is also a library of 1,600 volumes.

PHILLIPSBURG, a city and the capital of Phillips County, northern Kansas, 200 miles W.N.W. of Topeka, on the Chicago, Rock Island and Pacific railroad. It is situated in a fertile prairie and agricultural region, producing corn, cereals, sorghum, potatoes, hay, wool and live-stock. Population 1890, 992; 1895, 916.

PHILLIPSBURG, a city of Warren County, northwestern New Jersey, 50 miles N.N.W. of Trenton, on the Delaware River, opposite Easton, Pennsylvania, and on the Central of New Jersey, Delaware, Lackawanna and Western, Lehigh Valley and Pennsylvania railroads. It is in an agricultural, iron ore, and limestone region, and is extensively engaged in the manufacture of iron, having a rolling-mill and boiler and machine works. Other industries include a silk-mill and a large reaper and mower factory. The Delaware at this point is crossed by two iron bridges. Population 1890, 8,644; 1895, 9,081.

PHILOCHORUS, a historian of Attica. See EURIPIDES, Vol. VIII, p. 678.

PHILOCTETES, an archer in Greek mythology. He was the friend and armor-bearer of Hercules, who instructed him in archery and bequeathed him his bow and poisoned arrows. Philoctetes was one of the suitors for the hand of Helen, and on his voyage to Troy was wounded in the foot by the bite of a serpent, or, as another account has it, by one of his own poisoned arrows. The wound became ulcerated, and produced such a stench that the Greeks, on the advice of Ulysses, abandoned him on the coast of Lemnos. He remained on this island for ten years, until Ulysses and Neoptolemus came back for him, an oracle having declared that Troy could not be taken without the arrows of Hercules. Upon his arrival at Troy, his wound being healed through the agency of Apollo, he killed Paris and ended the war. Returning from Troy, he was shipwrecked upon the coast of Italy, where he built Petelia and Crimissa.

PHILOMATH, a village of Benton County, western Oregon, 16 miles W.S.W. of Albany, on the Oregon Central and Eastern railroad. It is the seat of Philomath College (United Brethren), a co-educational institution established in 1867, which

had, in 1895-96, 6 instructors, 50 students and a library of 800 volumes. Population 1890, 316.

PHILOMELA. See NIGHTINGALE, Vol. XVII, p. 499.

PHILOSOPHY OF THE CONDITIONED. See HAMILTON, Vol. XI, pp. 418, 419.

PHILTER, a love charm or potion common among the Greeks and Romans, and especially among the Thessalians. The ingredients were usually harmless, though sometimes poisons were used. It was held by some that Caligula's madness was caused by a philter administered by his wife, and Lucretius (q.v., Vol. XV, p. 50) is commonly said to have been made mad by the administration of a philter. The giving of a potion was usually, as it is now among less civilized people, coupled with magic rites. In the middle ages, love-powders were advertised for sale, and their use is common in the East to-day.

PHINTIAS. See ALICATA, Vol. I, p. 574.

PHIPS OR PHIPPS, SIR WILLIAM, an American ship-builder, adventurer and colonial governor of Massachusetts; born at Pemmaquid (now Bristol), Maine, Feb. 2, 1651. He left home at an early age and made a fortune in searching for Spanish vessels that had gone down in the West Indian seas. He also received the honor of knighthood at the hands of James II in recognition of his services. In 1690 he captured Port Royal, Nova Scotia, with a New England fleet, but was defeated in a similar attack on Quebec. Going to England in 1691, to promote a renewed attack on Canada, he was appointed the first royal governor of Massachusetts. He appointed a commission of seven magistrates to attend to all witchcraft cases, and so put an end to prosecution on that charge. He was called to London to answer charges of harshness in administration, and died there while, the investigation was in progress, Feb. 18, 1695.

PHLEBITIS. See SURGERY, Vol. XXII, p. 684.

PHLEGMON. See PATHOLOGY, Vol. XVIII, p. 398, 399.

PHOLOGISTON. See CHEMISTRY, Vol. V, pp. 460, 461.

PHOCIDÆ. See MAMMALIA, Vol. XV, pp. 443, 444.

PHOEBE-BIRD (*Sayornis fuscus*), a popular name of the fly-catcher of the United States. It is often called pewee or pewit. The names are attempted imitations of the peculiar notes of the bird.

PHENICIAN LANGUAGE. See PHENICIA, Vol. XVIII, p. 802; and SEMITIC LANGUAGES, Vol. XXI, pp. 646, 647.

PHENICOPTERUS. See FLAMINGO, Vol. IX, p. 286.

PHOENIX, a city and the capital of Arizona, and of Maricopa County, situated in the southern central part of the territory, on Salt River, 226 miles N.E. of Yuma, and on the Maricopa and Phoenix railroad. It is the trade center for a large district devoted to agriculture, stock-raising and mining. The city has national, incorporated and territorial banks, 3 daily and 5 weekly newspapers. Population 1890, 3,152; estimated 1895, 7,500.

PHOENIX, a village of Oswego County, northern

central New York, on Oswego River and canal, and on the Rome, Watertown and Ogdensburg railroad, 15 miles N. of Syracuse. It is in a dairying, farming and fruit-raising district; has an excellent water-power, and contains saw and flour mills, and manufactures of cutlery and tissue-paper. Population 1890, 1,466.

PHOENIX PARK ASSASSINATIONS. See *Lord Frederick Cavendish*, under DEVONSHIRE, and also HOME RULE, in these Supplements.

PHOENIXVILLE, a borough of Pennsylvania. It had, in 1890, two railroads, the Philadelphia and Reading and the Pennsylvania. There are in the borough numerous churches, a seminary and good public schools, two national banks with a combined capital of \$350,000, a public park, water-works and fire department. The works of the Phoenix Iron Company and the Phoenix Bridge Company are located here, and give employment to about 2,400 men. Other industries include manufactures of shirts, hosiery, pottery, machinery, silk and needles. Population 1890, 8,514. See also PHOENIXVILLE, Vol. XVIII, p. 811.

PHONAUTOGRAPH. See ACOUSTICS, Vol. I, p. 110.

PHONOGRAPH. Another recent product of electro-mechanical science, and one which bids fair to surpass even the telephone in commercial value, is the marvelous instrument known as the "talking-phonograph." The discovery of the phenomena on which it is based was made by Mr. Edison as far back as 1877, while the great electrician was engaged on some experiments for a totally different end. The underlying principle is the same law of acoustics operating in the telephone, that sound consists in a series of wavesspreading from a given source, and that their impact at any distance is in exact ratio to the pitch and volume of the original note. With a knowledge of the action of this law in the vibrations on the telephone diaphragm, it will not be difficult to understand the working of the phonograph, its essential purpose being to obtain a record by which sound-vibrations, whether of the human voice or some other agency, can be mechanically reproduced at any time after their occurrence.

As originally made, the instrument consisted of three parts,—the sender, the receiver or recorder, and the transcriber. The sender comprises a tube having an open mouthpiece at one end, and bearing at the other end a thin diaphragm of metal or other substance, with a sharp point, or stylus, affixed to the center of its outer surface. The second part consists of a cylinder about four inches in diameter, having on its periphery a V-shaped groove, cut spirally from end to end. Over this grooved cylinder a sheet of tinfoil is placed, and the sender is advanced till the point of the stylus lightly touches the tinfoil over the opening of the V-shaped cut. While the words to be recorded are spoken or sung, the cylinder is turned rapidly, the apparatus for moving it giving a lateral as well as a circular motion. The point of the stylus thus traverses the tinfoil spiral from end to end, and the vibrations in the diaphragm caused by the sound result in a series of indentations in the tinfoil. To produce the sound

in the sender or transcriber, the cylinder is again presented to a stylus attached to a diaphragm, the pointer being pressed against the tinfoil by a light spring. The cylinder is now made to revolve, and the motion of the stylus upon the inequalities in the indented tinfoil produce vibrations in the diaphragm corresponding to the sound-caused vibrations originally created in the instrument by the voice. The sounds are thus reproduced with great exactness, but with a softening of the consonants which, to some extent, alters the character of the voice. If the tinfoil record of song or spoken words be sent to a distance, or kept for a length of time, the original sound can be reproduced on applying it to the proper instrument.

Many defects were soon apparent in the working of this instrument, while its wonderful possibilities continued to excite the deepest interest. Ten years after his first revelation, Mr. Edison took up the invention again, and after careful study produced, in 1889, the phonograph as it is known to-day. The tinfoil is now replaced by a wax composition, which not only gives better results, but enables the vibration records to be multiplied in durable form. An electric motor serves to turn the cylinder; the diaphragms are of glass, and the stylus has a sapphire point. The utterance is also made into a trumpet or funnel, while for hearing back the communication rubber tubes are provided with tips to fit in the ears. Dictations are now commonly given in the phonograph for type-writers to transcribe, in another place. Songs are sung before it, and speeches and sermons addressed to it, that may be later enjoyed by many who were never within hearing-distance of the vocalist or speaker. Even the tones of the illustrious leaders and teachers of men are thus stored up, that they may be heard by posterity just as they were delivered. Among the latest developments is the sending of the cylinder-strips by mail, so that a correspondent hundreds of miles away may actually speak his message from the duplicate machine in which the recipient places it. What the invention will accomplish for us as it becomes cheaper and more accessible is simply beyond guessing. See also TELEPHONE, Vol. XXIII, p. 134; and GRAPHOPHONE, in these Supplements.

PHONOGRAPHY OR STENOGRAPHY. See SHORT-HAND, Vol. XXI, pp. 836-842.

PHONOLITE. See GEOLOGY, Vol. X, p. 234.

PHONOLOGY. See PHILOLOGY, Vol. XVIII, pp. 787-789.

PHONOMETER, an instrument devised by Thomas A. Edison for measuring the force of sound-waves produced by the human voice. It has a mouthpiece and diaphragm. Behind the latter a piece of rubber communicates with a spring that actuates a pawl, which is set to move a ratchet keyed to the same shaft as a fly-wheel. The instrument shows that the mechanical force of sound is considerably greater than was previously supposed. A loud, continued noise in the mouthpiece will drive the fly-wheel, which is about 15 inches in diameter, with a force sufficient to bore a hole through a pine board.

PHONOPHORE, a telegraphing device invented

by Mr. Langdon-Davies of London. Some years ago he first developed the system of transmitting signals through circuits, which in the ordinary sense are not closed. Recent experiments in his laboratory were made through an artificial line of four thousand ohms' resistance, and comprised the sending of phonophore messages alone and of phonophore and telegraph messages simultaneously in the same wire, and in the same or opposite directions. In one experiment the same wire transmitted a telegraph message and two phonophore messages simultaneously, and the working of the phonophores was perfect, even after the resistance of the line had been increased to twenty-three thousand ohms, when the telegraph messages, which were received by needle instruments, could no more be read. A further experiment was made with a line wire open at both ends, and containing a resistance of one hundred thousand ohms. In this case the ordinary telegraph could, of course, not be worked at all, but duplex working of the phonophore was perfectly feasible.

At St. Pancras, messages were being sent by phonophore between London and Leicester, in both directions, on one of the company's wires which all the time transmitted ordinary telegraph messages. The London phonophore was joined to the line between two Morse relays about half a mile apart, one at the passenger and the other at the goods station, while the Leicester phonophore tapped the line thirty miles from the nearest telegraph instrument, which is at Derby. Between Leicester and London there are, on this wire, about six telegraph instruments, and as during operation the continuity of the line is constantly being broken by the working, each instrument is shunted by a phonophore, so that the phonophore messages are translated some six times.

This method of bridging the telegraph instruments does not in any way diminish the clearness of signals as compared with a continuous wire. The messages were printed on a Morse receiver, which was actuated by a phonophore relay. The phonophore transmitter has a vibrating reed, and the distant phonophore receiver is also provided with a reed in the shape of a stretched steel band which can be tuned to the same note.

PHONOSCOPE. G. Demeny's instrument for the use of deaf mutes is a form of phenakistoscope, having a wheel on which are mounted continuous photographs of a person's face taken while uttering certain words. The wheel being mounted in a suitable box, the photographs may be rotated by a hand-crank, and viewed through a slit. A deaf mute, or other person understanding the facial motions incident to speech, may then interpret the words uttered by the person when the series of photographs were taken. Another form of phonoscope is designed to give visual representations of sound-vibrations. The mechanism includes an induction-coil, an interrupter and a rotary vacuum tube. The sounds of the voice may be made to vibrate a diaphragm in the interrupter, and these vibrations cause breaks in the current from the induction-coil. The makes and breaks of the current cause flashes of light in the vacuum-tube, and as the tube is rotated these flashes take symmetrical shapes, forming

streaks radiating from a center, the number of radii varying with the nature of the vibrations. The same sound always produces the same figures.

PHONOTELEMETER, an instrument for estimating the distance of a mark, etc., invented by Captain Thouvenin of Vincennes, France. It is a watch with a curve-measurer on the face, a compass on the stem, and a telemeter counter on the back. The curve-measurer is for determining distances on maps. For judging of distances on the field of battle, the plan is to start the watch on sight of an enemy's fire, and stop it when the detonation is heard, when the telemeter indicates the distance in meters.

PHORMINX or **CITHARA**. See **LYRE**, Vol. XV, p. 114.

PHORMION, an Athenian admiral and general who distinguished himself by so maneuvering the Athenian fleet in the Corinthian Gulf that he gained some remarkable victories over the Peloponnesian fleet in 429 B.C. In the following year he gained victories in the interior of Acarnania.—**PHORMION** or **PHORMIO**, an Ephesian philosopher of the Peripatetic school. See **PERIPATETICS**, Vol. XVIII, p. 546.

PHOSPHATES. See **PHOSPHORUS**, Vol. XVIII, pp. 818, 819; and **APATITE**, in these Supplements.

PHOSPHINES. See **CHEMISTRY**, Vol. V, p. 577.

PHOSPHOR-BRONZE. See **PHOSPHORUS**, Vol. XVIII, p. 817.

PHOSPHORIC ACID. See **PHOSPHORUS**, Vol. XVIII, pp. 818, 819.

PHOSPHOROSCOPE. M. Becquerel's device is described under **LIGHT**, Vol. XIV, pp. 602, 603. Another form of phosphoroscope is a toy consisting of pieces of hollow glass made in tubes or to represent figures, and filled with some familiar phosphorescent substance exhibiting color, as the sulphides of lime, barium, etc. When exposed to the light and then brought into a dark room the figures glow with colored light.

PHOTO-BAROMETER. See **BAROMETER**, Vol. III, p. 384.

PHOTO-CHARTING. See **SURVEYING**, Vol. XXII, pp. 716, 717.

PHOTOCHRONOGRAPH, a form of chronograph adapted to measuring the time of photographic exposures of short duration. One form consists of a blackened disk which is made to rotate, with a spring pressed against its face. Power is applied to the disk, which is started by releasing a brake, and stopped by putting it on. The instrument is set up facing the camera, in a strong light. A lever is worked to vibrate the spring. The disk being rotated during the exposure, a waved white line is traced on its face by the vibrating spring. The length of the line and the vibrations being noted, the exact length of time is very accurately determined.

PHOTOCHRONOGRAPH, **ASTRONOMICAL**, an instrument for photographing a star, or the like, and also recording the time of its transit. It is a photographic device, connected with an astronomical chronograph and a transit instrument, and was designed by George A. Fargis and Frank H. Bigelow.

The chronograph is used to record the time of transit of stars across the reticle lines or wires of the telescope, and the addition of a photographic device was desired to reduce the errors caused by visual observance of the passage of the stars. It was necessary to do this without injury to the star-trails, and the result was accomplished by means of a small plate attached to the armature of a magnet, by which an up-and-down movement, perpendicular to the star-trail through a small interval, could be communicated to the plate by making and breaking the circuit at fixed intervals, preferably by means of a clock. The intervals shown on the plates taken with this apparatus are definitely marked, and settings of a micrometer-thread may be made on them very accurately, with a probable error of not more than one fiftieth of a second.

PHOTO-ENGRAVING or **PHOTOGRAVURE**. See **PHOTOGRAPHY**, Vol. XVIII, p. 834; **SURVEYING**, Vol. XXII, p. 717; and **ENGRAVING**, in these Supplements.

***PHOTOGRAPHY**. It is not the purpose of this article to supply a history of photography, but to record the advances made in this art in recent years. Only the most serviceable of these can be noticed. (For a full treatment of the origin and history of photography to 1880, see Vol. XVIII, pp. 821-840.)

From "the beginning," so far as we know, until the present century the lovely images which responded to the action of light upon material objects were fugitive. Ultimately, means were discovered for fixing them, and—but the story is familiar to every one, so it is needless to repeat it.

The production of pictures by the processes of photography is so symbolical of creation, is so fascinating, and so applicable to the world's work in endless directions, that the art has never wanted for enthusiastic votaries willing to face its drawbacks and difficulties, and by patient research and persistent experiment overcome them.

The aims and results of photographic research, then, will be considered here, rather than chronologies. To reduce the time required to secure the latent image has been one of the chief aims of the experimentalist. Effort had to be made in various directions. When lenses were first employed in photography they were very imperfect. Among other things, they distorted the image, and their action was all too slow. The first fault was due to construction, and the latter to material. How to correct the lenses, then, "for figure" and "for color" was an early problem. Step by step this was solved, and years ago objectives were made by which perfect pictures were secured instantly, define that term as you will. Vast progress has been made during the three years last past by the use of a new kind of glass introduced by Abbe and Schott at Jena, Germany. This wonderful product enables the lens-maker to employ a variety of about seventy sorts of optical glass instead of, say, less than a dozen, formerly available. Nearly all of the old faults having been overcome, the opticians now devote

themselves to the niceties of construction, while the difference in result becomes a matter of choice.

Chemistry has proven such a faithful handmaid to optics that the patient plodders in the laboratory are entitled to share the honor of bringing forth so quickly the most *spirituelle* impression of the faintest ray falling upon the sensitive surface, by the most beautiful operations known in science. In the technique or workmanship of the photographer the greatest changes have taken place, accompanied by important improvements in the results. These improvements, in the posing of the model and in the management of the light, have been made possible by the careful study and application of art principles and by the investigation and better understanding of the theory and management of light.

With the portraitist, these direct not only the choice of position and the control of the light, but also the selection and arrangement of the accessories.

The exposure of the sensitive surface is very often a matter of inspiration, and must be determined by the circumstances of the occasion. Useful exposure-meters are much used out of doors, and their employment, with the selection of the subject, the direction of the light, the management of the shadows, the choice of the day and of the time of day, is involved in the technique. A wider intelligence, greater care, attention to trifles, better "workmanship" in fact, have repaid with "pictures" as well as photographs.

In the earlier days no attempt was made at photography without sunlight, and plenty of it. Now, light from a variety of sources is employed. The once uncertain magnesium light, the incandescent gaslight, the erratic electric spark and the mysterious cathode ray (even "black" light), all render service whenever sunlight is either inaccessible, insufficient, inconvenient or indisposed. Even the glow-worm emits sufficient light to affect the sensitive plate.

After the exercise of the most intelligent technique, followed by careful manipulation, comes the employment of the retouching pencil to "correct" weaknesses and oversights, or, what is all too frequently the case, to annul and despoil the values secured by the previous operations.

In the *manipulatory* department extensive changes have been made. So great are these that the modern or "dry"-plate photographer finds himself wholly unable to cope with the difficulties of the old-time or "wet"-plate processes.

Although films and pellicles were suggested as substitutes for glass as early as 1871, they have not yet proven themselves preferable. By their use a saving is effected in weight and bulk; their liability to break is less than that of glass, and they make the rollholder possible. But their manipulation is often troublesome; their quality is too much controlled by the material upon which they rest (usually celluloid), and they cause

much disappointment by deterioration and faults of manufacture.

The orthochromatic or isochromatic plate renders it possible to photograph colors at their true value, or approximately so. Color-sensitiveness is secured by the addition of certain aniline dyes (usually of the eosine group) to the sensitive bromide of silver emulsion. A color-screen is employed with these plates to secure the most delicate color-values.

One of the most annoying drawbacks of the modern dry plate is halation, or the spreading of the light beyond its proper boundaries in the negative image. Reflection of light from the back surface of the plate is the chief cause. The tendency to halation is obviated in several ways: 1. By coating the plate with more than one film of emulsion differing in sensitiveness; 2. By staining the emulsion with a dye which will wash out during the processes of development and fixing, and by "backing" with an opaque mixture in optical contact with the plate.

The development of the image has received the most attention of any of the manipulations. It affords opportunity for an infinite variety of modifications. The improvements sought for by these have been in the direction of speed and quality. As record cannot be made here of a tithe of the suggestions and formula available. A good working-process is presented below, which, with thoughtful use, will answer all ordinary demands. Improved results are secured by the intelligent use of the fixing-solution. The first thing which made this possible was the production of a purer quality of hyposulphite of soda; the next grew from the consent of the manipulator to employ the hydrometer and the thermometer to standardize the fixing-solution. The importance of such tests cannot be over-rated.

Complications constantly arise because of the indisposition to agree upon a standard of weights and measures.

Printing. The art of producing positive photographs upon prepared paper or other surfaces has met with numberless changes, although none of the old processes have become obsolete.

The desire for easier manipulation has caused many to depart from the use of albuminized paper, and resort to ready-sensitized gelatine and collodion papers. Those objecting to the brilliant surface of the above have recourse to mat-surface papers of various kinds, while the carbon and the platinum printing processes, with modifications, hold a share of the preference.

Time has not furnished a method of overcoming deleterious chemicals, careless manufacturing and indifferent manipulation, so that some photographs are yet found to fade.

The introduction of papers coated with silver bromide and gelatine, in emulsion similar to that used in the production of "dry" plates, opened up new industries, practically. By their use, with the assistance of electric light, enlargements and direct prints are made with the greatest facility. When thousands of one subject are

desired they are quickly and uniformly produced by the use of bromide paper and automatic machinery with electric light. In the development of bromide prints on certain papers, a brush is used to apply the developer in lieu of the other methods. In the platinum and other processes, the brush is used likewise.

The intelligent demands of the user of apparatus has been faithfully met by the manufacturer, until now the product, in design and construction, is equal to the best of philosophical and astronomical appliances. In this direction, also, greater speed and improved quality have been obtained.

Rapid reproduction has also been sought for most industriously. While the old-time printer stood dozing over his negatives as they rested in the sun, he dreamed of a quicker method of multiplying his pictures with the promise of longer life for them. By numerous processes this dream has been realized; and now the steam-press is the printer, and the pictures it produces far surpass the earlier product of the veteran dreamer. All methods of hand-engraving have been compelled to share with this young usurper of the reproductive arts. It has also bound the powerful electric light to its service; chained intricate machinery; started new industries for the production of supplies; and is now compelling nature to yield her natural colors to the cajolery of the camera.

So, then, photography has become the chief factor in the illustration of books, magazines and periodicals, using processes detailed in the articles on photo-engraving and in the text-books of the art. (See PHOTOGRAPHY, Vol. XVIII, p. 834; and ENGRAVING, in these Supplements.)

The further applications of photography are without limit. So willing and able a helper has it become that scarcely an advance is made in science, art or industry, until answer is had, through actual test, to the query, "What does photography say?" The stars are not too numerous for it to count; neither sun nor moon can hide their spots from it; the swiftest projectile leaves its track upon the sensitive plate; faithfully it records the tones of the sweetest voice; catches the thoughts nestled in the brain; discovers the "skeleton" in every human house; burrows under the ground; dives into the sea; climbs up into the air; steals into every niche; reveals what the eye cannot see or the senses discover. Among the distinct advances in which modern photography helps, the following are worth noting briefly:

Photo-grammetry, the use of photography in surveying, determining and mapping boundaries, new countries, etc.

Composite photography, following the work of Galton.

Photographs of movement, in which Anschütz, Muybridge and Marey have done wonderful things; kinetoscopes and the cinematograph; long-distance photography, made possible by the tele-photographic lens.

Spectrophotography, and its usefulness in chemistry and astronomy.

The usefulness of photography in meteorology

—study of earthquakes, barometric observations, wind, lightning, clouds, etc.—is extensive.

In medicine and surgery photography is useful. The larynx, the interior of the stomach, the eye, and other organs, are exposed by it. The identification of criminals, the detection of forgeries, and other uses in judicial procedure; the registration of ships' courses (and wave-lines used in naval-construction), the determination of latitude by photography, photo-micrography and micro-photography—all find their acceptance to an unlimited extent.

The use of photography in providing subjects for magic-lantern or stereopticon projections, and for the microscope, next to portraiture, gives the most pleasure and instruction.

By white light, by colored light, by black light or by any other light—all these serve. "Let there be *light*," and photography will answer any demand.

Two of the most recent applications of photography are, at this writing, exciting the greatest public interest. The first involves the discovery of Prof. W. C. Roentgen that fluorescent rays are developed in peculiar abundance in the highly exhausted tubes known as Crookes tubes, and that they will penetrate with unexpected facility a great many optically opaque substances. Experimenters do not agree as to the character of these rays. Professor Roentgen says they proceed from the cathode terminal; Professor Rowland and others claim that they come from the anode; while Tesla claims that they are not vibrations of any sort, but are streams of projected material particles. Profs. O. N. Rood and A. M. Mayer have proven that the new rays are incapable of polarization, and therefore radically different from any rays of light or heat heretofore observed. This much is sure,—i.e., that they possess great photographic power, and that the photographic plate has yet another means of *seeing in the dark*, besides that due to its power of perceiving vibrations whose wave-length is too short to affect the nerves of the retina. President Henry Morton of Stevens Institute claims this *accumulative* action, or capacity of *storing up* the effects of any sort of vibrations capable of impressing it (rays too feeble to affect the eye), will, in time, impress the sensitive film. Proof of this is abundantly shown by the photographs of stars too faint to be perceived by the eye, taken at the Harvard Observatory, under the Henry Draper memorial, by Professor Edward C. Pickering. The peculiar properties of fluorescent light were publicly exhibited by President Morton as early as 1872. This was soon after his discovery of *thallene*, a hydrocarbon which possesses the property of fluorescence in a remarkable degree. See *Chemical News* (1872), *L. and E. Phil. Mag.* (1873), and *American Chemist* (1873).

Lastly, but practically most important of all, is *photographs in natural colors*. These, made without applying the colors by hand, or in some other mechanical way, do not yet exist. The efforts to produce them began with Niepce de St. Victor,

and have since led experimentalists in about as many directions as has the production of pictures in black and white. They have been attempted in the chemical way (by silver subchlorides), in the physical way (by the action of interference in the interior of the film), and in the optical way (by the projection of three-glass positives, corresponding to the foundation-colors, with the help of corresponding colored media), and some very beautiful results have been shown, but the great secret is yet withheld. Nevertheless, wonderful progress has been made in the production of pictures in natural colors with photographic effects. Photography has been the principal means employed, letterpress coming in as second helper. More has been done than the simple use of photography as a "key" in letterpress color printing. In what is termed the "three-color process," photography is used throughout for the production of the printing image. This was reached by a long series of experiments, beginning in 1861, but not much headway was made for a few years, because of the absence of photographic plates sensitive to the yellow or red rays. In 1873 Dr. H. W. Vogel of Berlin discovered how to produce such plates. He was soon followed by others; but not until 1892 did the results prove that a practicable method had been attained for three-color reproductive purposes. The collotype printing process was first used, and numerous American establishments are, at the present time, producing unlimited quantities of prints of excellent quality by this method. But the application of the three-color process to letterpress printing, by means of the transfer of the three different photographic images to letterpress or half-tone blocks, now supplies the most economical and expeditious method, with results which have not been excelled. They appear in the market as reproductions usually because of the long time required for the exposure of three negatives, and the obvious difficulty encountered in procuring three negatives (so exactly alike that they register) from any natural or "living" object or scene.

Mr. R. D. Gray of New York, a practical optician, has secured the best results. To combine or superimpose the pictures is not a serious matter if suitable apparatus is provided for it. Mr. Gray makes ordinary positives on glass for lantern projections, and secures one of them in a wooden frame which contains spaces for three other slides. To the next one is attached a mechanical device with very delicate screw-adjustments by which it can be moved in any direction. The operator at the lantern now moves the picture, as directed by an observer near the screen, until its position is identical with the first, when it is said to be "in register," and is sealed in that position. The operation is repeated until all are finished. Each frame is used as an ordinary lantern slide, but in a lantern built with a corresponding number of optical systems with provision for inserting colored glasses in the paths of light, each of which should be of a similar

color to that used in taking the negative. If three positives are used, and they are equally transparent in one part of the picture, the red, green and blue lights passing through that part will appear white on the screen. If the blue positive is more opaque in that portion of the picture, the red and green lights will predominate, producing yellow; or if the green positive should be opaque, the red and blue lights in excess make purple. Thus the varying degrees of opacity in the positives caused by the selective qualities of the photographic plates and color-screens, however slight, are effective, and the resulting picture shows the delicate tints as well as the brilliant colors of nature.

For reproductions on paper by collotype or half-tone there is no greater difficulty, and the best of presswork and proper colors have combined to flood the world with "photographs in natural colors," as near as possible so far.

Joly and McDonough are experimenting in different directions for the production of photographs in colors from one plate. They rule the plate very finely, with a machine, alternating with lines of red, blue and yellow fluid colors; the printing-paper is lined, also, with similar colors. The results are promising. Kurtz, Bierstadt, Edwards, Ives, Lipmann, Lumiere, and many other industrious experimenters, are making progress in this department of photography.

Instructions now follow for the production of photographic pictures for commonplace purposes. These are gathered from the best sources, and will enable the novice to practice photography with satisfaction and pleasure.

"Dry"-Plate Photography. The introduction (1878-80) of the *gelatino-bromide emulsion process* completely revolutionized the practice of photography. By this process, dry sensitive plates, being much more rapid than those prepared by the older collodion processes, are manufactured in quantities, and stored ready for use when needed. Furthermore, when a "dry" plate has been exposed in the camera, its development and fixing may be deferred for an indefinite period, whereas collodion plates must be separately sensitized before exposure, and developed, etc., immediately afterward, which necessitates the transportation of bulky impedimenta when outdoor photography is attempted. Since its inception, the gelatino-bromide process has been modified in innumerable details, but the general principles remain the same. The commercial preparation of "dry" plates forms one of the most important of the photographic industries. The condensed description of the Paget prize method here given may be taken as representative of the process generally. Prepare two solutions, as follows: 1. Hydrochloric acid (pure), 1 fluid dram; distilled water, 12½ ounces; 2. Nelson's No. 1 gelatine, 80 grains; bromide of ammonium, 210 grains; distilled water, 3 ounces. Twenty minims of No. 1 are added to the whole of No. 2 and the gelatine left to swell. In a glass beaker 330 grains of nitrate of silver are dis-

solved in three ounces of water. Two fluid drams of this latter solution are poured into a test-tube and diluted with an equal volume of distilled water. The solution of the bromized gelatine is then completed by immersing the bottle in hot water, and the diluted nitrate of silver solution is added all at once. The bottle is then shaken, and the remainder of the strong silver solution is added in quantities of half an ounce at a time, shaking as before, after each addition. The emulsion so formed is boiled for 55 minutes, and when cooled to 90° F., one ounce of Nelson's No. 1 gelatine, which has previously been swelled and dissolved in water to make four ounces, is added. When set, the emulsion is squeezed through canvas into a pan containing three ounces of a saturated solution of bichromate of potassium in 48 ounces of water, and allowed to remain in it for an hour. The emulsion is then again squeezed through canvas into clear water, and the operation immediately repeated, it being allowed to remain in the last wash-water for thirty minutes. The addition to the emulsion of two ounces of alcohol, and sufficient water to make up the solution to twenty ounces, completes the process. When filtered, the emulsion is ready for spreading upon its support. Plates of absolutely clear glass are now coated with the sensitive solution, and placed on level shelves in a drying-closet until the films are quite dry, when they are ready for use. These operations are necessarily conducted in non-actinic light. When exposed in the camera, such plates, after development, give a "negative" image; if, however, they are exposed under a "negative" previously obtained, they yield, after development, a "positive" image. As ordinarily prepared, gelatine dry plates are not capable of giving a correct representation of the color-values of the subject photographed, being unequally sensitive to the various colors of the spectrum. The researches of Vogel and others have resulted in modifications, by which plates may be made color-sensitive; that is, capable of giving in the negative the proportionate value of the colors of the subject (see notes above). This and all other improvements are fully described in Wilson's *Cyclopaedic Photography* (1895), Eder's *Hand-book on Emulsion Photography* (1893), and other works.

Negative-Making. When a gelatino-bromide plate is exposed in the camera to the action of light, the sensitive film is impressed with what is known as a latent image, i.e., an image which, though present on the surface of the film, is not apparent to the eye. By subjecting the exposed plate to the action of chemical agents known as "developers," the latent image is made to appear, or is "developed." Many substances are available for this purpose. With the first dry plates the ferrous-oxalate developer, consisting of combined solutions of neutral oxalate of potassium and sulphate of iron, was largely used. This was extensively superseded by pyrogallol, which is still, perhaps, the developing agent in

general use. A simple formula for the preparation of the pyrogallol developer is as follows:

STOCK SOLUTION No. 1.

Pyrogallic acid	¾ ounces.
Sulphite of sodium	3 ounces.
Sulphuric acid (C.P.)	15 drops.
Water	40 fluid ounces.

STOCK SOLUTION No. 2.

Carbonate of sodium	3 ounces.
Bromide of potassium	8 grains.
Water	40 fluid ounces.

Filter both solutions and keep in well-corked bottles. Mix equal parts of No. 1 and No. 2 immediately before using. Four ounces of developer is sufficient for a plate 5 by 8 inches. During the past ten years new developing agents have been introduced with such frequency that it is impossible to refer to them in detail. Some of these are peculiarly adapted for special classes of work, and have other advantages. Among those in common use may be mentioned hyroquinone, eikonogen, paramidophenol, rodinal, metol, glycinamidol metacarboll. Eikonogen and metol are largely used by amateur photographers for "snap-shot" or instantaneous work. Formulas and instructions for their use may be found in almost all photographic text-books.

After the development of the image, the film still contains unaltered sensitive silver salts, and if exposed to light would darken, and be rendered useless by the obliteration of the image. To prevent this these salts are dissolved out and removed by the process of fixing. This is effected by immersing the developed plate in a solution of one part of hyposulphite of soda in four parts of water, which clears out the unaltered salts and leaves the image clear and transparent. If the exposure of the plate has been made in a camera, the lights and shadows of the subject are seen to be reversed in the plate, and it is called a "negative"; if exposed under a negative, the lights and shadows, viewed by transmitted light, appear as in the subject, and the plate is called a "positive" or "transparency."

Film-Photography. As early as 1871 the late W. B. Woodbury suggested the use of films coated with a sensitive emulsion instead of glass plates for negative-making. After the gelatino-bromide process came into general use this suggestion was taken up and now gelatine-bromide emulsions are coated upon sheets of insoluble gelatine or transparent celluloid as a support, in lieu of glass plates.

The Positive Printing Processes are generally classified into printing-out methods, which give a fully printed-out image on the sensitive surface exposed to light under a negative, and development methods, which, under similar conditions, give an invisible or faintly visible image requiring to be developed with suitable reagents until it attains its proper vigor or strength. Previous to 1880 the plain salted and albuminized paper processes were in general use, while the carbon process represented the few development methods then available. During the past 15 years con-

siderable progress has been made in this branch of photographic practice, until now the number of printing methods available is so large that a brief description of representative processes of the two classes mentioned is all that is here possible. Among the print-out processes the first place, perhaps, may be given to printing on *gelatino-chloride paper*. The first suggestion of gelatine as a vehicle to hold the sensitive silver salts on paper for printing, as a substitute for albumen, was made by Hardwich in 1856. In 1881, Wilkinson published a method for preparing gelatino-chloride paper, based on the suggestion referred to, and a year later, Abney published the earliest practical method of producing such a paper. It was not until 1885, however, that gelatino-chloride ready-sensitized paper was commercially introduced by the late J. B. Obernetter of Munich. He was followed, in 1886, by Liesegang, with a paper called "aristotype." This name is now generally used for printing-out papers of this kind. The use of aristotype papers in America began about 1889. They have, in a large measure, superseded the older kinds of print-out papers. The preparation of gelatino-chloride paper is thus described: Paper is coated with a fine layer of chalk or baryta and finished (according to the surface desired in the resulting emulsion paper) with either a mat or glossy surface. It is then uniformly coated with a film of sensitive emulsion made as follows:

A. Nelson's No. 2	C. Nitrate of potas-
gelatine-----240 gr.	sium-----63 gr.
Water-----4½ oz.	Chloride of so-
B. Nitrate of silver--225 gr.	dium-----63 gr.
Water-----1½ oz.	Water-----1½ oz.

Add B to A and emulsify into C. When emulsified, add 6 drams of alcohol and 1 dram of water containing 9 grains of salicylic acid and 1 grain of chrome alum. This emulsion should be prepared and the paper coated with it and dried in non-actinic light. When dry the sensitive-coated paper is stored under light pressure, away from light, until required for use. To obtain a print, the paper is placed under a negative in a printing-frame and exposed to light until the full details of the picture are printed out. It is then washed in several changes of water until the free silver present in the film is all dissolved out. The print at this stage presents a disagreeable brick-red tone which may be changed to brown, purple or black by immersing in a toning-solution. This may be composed of water 32 ounces, chloride of gold 2 grains, made slightly alkaline by the addition of carbonate of soda. As soon as the desired tone is obtained the print is placed in a solution of diluted acetic acid (½ ounce acetic acid to a gallon of water) for a few minutes, rinsed in clear water and fixed by immersion for 15 minutes in a fixing-bath composed of hyposulphite of soda 1 ounce, water 20 ounces. This renders the print insensitive to the influence of light. After fixation it is well washed in running water for an hour, when it may be mounted and fin-

ished. A print-out paper widely used is *collodio-chloride paper*. This is very similar to gelatino-chloride paper, except that the sensitive salts are held in a collodion instead of in a gelatine film. This process was invented by G. Wharton Simpson in 1864, but, like the gelatino-chloride process, has been commercially adopted only of late years. The manipulations for its use closely resemble those already given for gelatino-chloride paper. A great variety of effects in color and finish may be obtained with either of these papers by modifications of the formula.

In 1883, Pizzighelli announced a process by which prints in platinum instead of in silver were made by a print-out method. These prints have a cold black tone, and resemble engravings. In this process a hard-surface paper is coated with arrowroot, ferric oxalate, oxalic acid, ammonium oxalate and chloro-platinite of potassium, in solution. When dry, the paper is exposed to light in the usual manner, and the image fixed by immersion in a solution of hydrochloric acid and water. Then the prints are well washed. They are then, it is claimed, "absolutely permanent."

The Gelatino-Bromide Paper Process is the best known of the development-printing methods. The sensitive surface used in this process is gelatino-bromide emulsion (see *Gelatino-Bromide Emulsion Process*, above) coated upon stout paper. It is known as bromide paper. By exposure to light under a negative, and subsequent development, it gives a black and white picture similar to an engraving, but the image is made up of a fine grain instead of the lines observable in an engraving. Being sensitive to light, bromide paper must be handled with the same precaution required in the use of dry plates. The filling of the printing-frames and all after manipulations, except the exposure, must be done in non-actinic light. The usual method followed is to expose the paper under a negative in a printing-frame at a distance of about a foot from a gas-burner of average intensity for a few seconds. It is then removed from the printing-frame (in the dark room) and immersed in clean water until it becomes limp. The invisible image obtained by exposure is now developed with almost any of the developers recommended for dry-plate work. Metol is advised, as peculiarly advantageous for bromide paper. Prepare:

1. Metol-----35 gr.	2. Carbonate of potas-
Water-----8 oz.	sium-----6 dr.
Add 6 drams of sulphite	Water-----8 oz.
of sodium to above when	
the metol is dissolved.	

To develop, mix equal parts of No. 1 and No. 2 and dilute with an equal volume of water. According to the duration of the exposure and the sensitiveness of the paper, varying quantities of No 1 are used, as indicated. Ferrous oxalate, amidol, hydroquinone or pyrogallol may be used instead of metol. When developed the prints are immersed in a bath composed of alum 6 ounces, citric acid 1 ounce, water 8 ounces. They are then rinsed in three or four changes of water, and fixed by immersion for five minutes in a solution

of hyposulphite of soda 4 ounces, water 20 ounces. Finally, they are washed, mounted and finished, as usual. Various processes have been suggested for changing the color of bromide prints by intensifying the image. Details of these modifications may be found in the textbooks devoted to the subject. Bromide paper may also be used for obtaining large direct positives, called enlargements, from small negatives. This is done by blocking the whole of a window except a small space just large enough to take the negative to be enlarged. Place the negative in the rebate slide of the camera, usually occupied by the focusing screen, and fix the camera close up to the open space in the blocked window, so that all light entering the room comes through the negative (the lens being turned into the room). In the darkened room, at some distance from the lens, a sheet of bromide paper is tacked to a vertical stand and the image of the negative is focused upon it. The exposure is then made, after which the enlarged image obtained is developed and fixed in the usual manner.

The Platinotype Process, invented by Willis in 1878, and considerably modified in 1890, may be considered as a typical method of printing by development. The preparation of the paper used in this process has not been published, but the process is based on the reduction of ferric oxalate (by the action of light) to ferrous oxalate and the further reduction of a platinum salt by ferrous oxalate to a metallic state when wetted with a suitable developing agent. Paper is coated with a solution of ferric oxalate, oxalic acid and mercuric chloride in water. When it is dried it is exposed under a negative in the usual way and the faint image so obtained is developed by immersion in a bath of oxalate of potash and chloro-platinite of potassium in water. When developed the prints are fixed by immersion in three changes of a weak solution of hydrochloric acid and well washed.

The Kallitype Process, introduced by Nicol in 1890, is a development method based upon the action of light on the iron and silver salts in combination. In this process Rives paper is slightly sized with gelatine and sensitized by brushing the surface with a solution of ferric oxalate and nitrate of silver. The paper is exposed to light under a negative, and the faint image thus obtained is developed with a solution of borax, Rochelle salts and bichromate of potassium. It is fixed by immersion in a weak solution of ammonia, and thoroughly washed. According to the composition of the sensitizing and toning solutions the resulting prints vary in color, as red, brown or black.

Thus, briefly, a running account of photographic progress since, say, 1880 is made. This progress in the direction first named has been wonderful. When daguerreotypes were made the exposure required was half an hour. It is now difficult sometimes to divide a second into sufficiently small parts to record with one part the

time taken to make the impression upon the sensitive plate.

EDWARD L. WILSON.

PHOTOGRAPHY, ASTRONOMICAL. The idea of applying the photographic method to form pictures of the heavenly bodies seems to have originated with Dr. John W. Draper, of New York. About 1843 he succeeded in taking a daguerreotype of the moon. This process was, however, too slow to be applied on a large scale to other heavenly bodies than the sun. The method, therefore, was little developed until the process now known as photography was discovered.

This process was soon applied with great success by the late Dr. L. M. Rutherford, of New York, who, in 1864, had mounted in his garden in New York City a telescope, which was especially constructed to take photographs of the heavenly bodies. His photographs of the moon soon acquired celebrity on account of their sharpness and minuteness of detail. He also showed that the same method could be applied to the exact measurement of small distances in the heavens. This was done by taking photographs of clusters of stars on glass negatives. He applied the method with the greatest success to the Pleiades. It consisted in forming a photograph of the cluster in the principal focus of his telescope. Thus on the glass plate he had an image of the Pleiades as they appeared in the heavens. He then devised an instrument for measuring the distances and relative positions of the stars found on the plate. With the aid of these measures, their positions in the heavens relative to the central star of the group, Alcyone, were determined with an accuracy rivaling the best measures hitherto made.

A farther step in the same direction was taken by the Rev. Charles Pritchard, director of the observatory at Oxford, England. By photographing a bright star surrounded by a number of faint and therefore more distant ones, at different times of the year, he was enabled, by the slight displacement of the bright star on the plate, to determine the parallax of the latter. Whether this method is as accurate as others is still an unsettled question, but there can be no doubt of its value.

When, in 1888, Professor Holden took charge of the Lick Observatory, he saw that with the unrivaled means at his command excellent work could be done in photography. He therefore invited Prof. E. E. Barnard, of Nashville, who combined most happily the two professions of photographer and astronomer, to become a member of his staff and apply his art to the heavens. The result has been an unequaled collection of photographs of celestial objects, which, at the time of writing, is in course of publication by Mr. Barnard. It was found by Gill, at the Cape of Good Hope, as far back as 1882, that with a common camera it was possible to photograph stars down to the ninth magnitude—a limit far beyond that which the naked eye could distinguish. By applying this method Barnard was en-

abled, without expensive apparatus, to make his most interesting pictures.

At the present time the most important work going on in celestial photography is the great International Photographic Chart of the Heavens. In 1886 it was found by the brothers Henry, at the Paris Observatory, that with a certain special construction of telescope it was possible to photograph all the stars in a pretty wide field of view, down to the lowest limit visible with any ordinary telescope. The plan was, therefore, devised of an international enterprise, having for its object to take photographs of the entire heavens as they appear in our time, for the use of posterity in detecting changes that may take place. Invitations were sent to astronomers interested in the subject in all parts of the world to assemble at a general convention in Paris in April, 1887. There the details of the plan were worked out by committees, and the instruments and methods to be used were decided upon. A number of observatories engaged to procure the instruments and take part in the work. The latter has been successfully prosecuted up to the present time. Several observatories have nearly completed their share; though, as might have been expected, others are far in arrears. But there is no doubt that, at no distant day, the work will be finished.

In the various fields of physical astronomy, the photographic method has proved of the greatest value. As far back as 1869 it was applied by Winlock, and others in the United States, to take photographs of the total eclipse of the sun which occurred in that year. The solar corona, with all its irregularities, was thus placed permanently on record for study. As more sensitive chemicals and more refined methods were applied in successive solar eclipses, it became possible to fix more and more details in this way. The filamentous structure of the sun's corona has thus been brought out with greater certainty than it could be by mere eye observation during the rare moments of an eclipse.

It has even been supposed possible, by some of the highest authorities, to photograph the solar corona when there was no eclipse. But it seems very doubtful whether this has actually been done or can be done. The glare of the sun's light in its immediate neighborhood is so intense as completely to obliterate the faint light of the corona; and it seems likely that the supposed corona photographs have been only those of the light diffused in the earth's atmosphere.

Another important application of photography has been the photographing of spectra of the stars and planets. As in other cases, the method has the advantage over eye observations that the observer can measure the lines on his plate at leisure with much more care and attention than he can devote to the measurements in a moving telescope. The chemicals now used are so sensitive that it seems possible to photograph at least everything that can be seen, and quite likely much that would be invisible to the naked eye.

Indeed, large nebulous regions have been photographed by Barnard and Pickering in Orion and around the Pleiades, where nothing of the kind has ever been seen by the eye.

The observatory which, in recent times, has applied the photographic method to the spectroscopic study of the stars on the largest scale is that of Harvard College, under the direction of Professor E. C. Pickering. An important part of his work is a general study of the photographic spectra of the various stars. Instead of attaching a spectroscope to the eye-piece of the telescope, which is the usual method of forming the spectrum of a star, a large prism of small dispersion is placed over the object-glass. The advantage of placing the prism here is that the effect of atmospheric undulation is many times less than it would be were the prism applied to the eye-piece. Then, when the telescope is pointed at the heavens and set in motion, all the stars in the field of view are shown as so many spectra. These spectra are all photographed on the plate in the focus of the telescope. The negatives thus formed can be studied at leisure. A corps of examiners, mostly expert young women, is employed to study the innumerable images on every plate, and detect those showing any special peculiarity.

Among the noted instruments being here brought into use is the great Bruce photographic telescope, the gift of Miss C. W. Bruce, of New York. This instrument is remarkable for the shortness of its focal length as compared with its aperture. The latter is 24 inches, while the former is 11 feet. An extraordinary concentration of starlight on the plate, with a corresponding diminution of the bad effect of atmospheric undulation, is thus attained. This short focal length with such an aperture would not be successful in a telescope of ordinary construction, with only a single objective. The construction is, therefore, that of the "doublet," with two objectives, thus forming a gigantic camera. With such an instrument it is possible to photograph a region of the sky about five or six degrees in diameter without any serious loss of definition, unless at the extreme edge of the field.

Yet another application of photography at the same observatory is that of a constant watch of the sky to detect any new star which may show itself in the heavens. The apparatus for doing this consists of a small telescope, having a field of several degrees, which moves automatically by successive jumps, from horizon to horizon, and at each point photographs the principal stars on the plate in its focus. The various fields photographed are thus combined on the same plate so that it is impossible to distinguish them. But no distinction is necessary, because all that is required is to detect any new star that may appear. How often soever the telescope may pass over the same region, the same stars will be photographed upon it, and therefore the appearance presented by the plate will be the same. If, however, a new star puts in its appearance, it will be de-

tected by a comparison with the other plates just as certainly as a criminal is detected by the Bertillon measures of his head and limbs.

Notwithstanding all these advantages, the photographic method has its drawbacks. As a general rule, delicate details cannot be impressed on a photographic plate so well as they can be seen. The great foe of astronomical observation, atmospheric undulation, can be better evaded by the eye than by the unthinking plate. The astronomer who looks at the planet Mars through a telescope in order to outline the features on the surface of the planet finds that, during the greater part of the time he is looking, these features are obliterated by the undulations of our own atmosphere. He therefore waits for the moments of good definition, and takes advantage of them to make his measures and note his observations. But the photographic plate can exercise no such discrimination. It records everything as it appears, undulations and all, and thus the most delicate details fail to be developed because they are confused by the motions of the atmosphere.

There is no branch of astronomy in which the amateur can work so easily and successfully as this. As already remarked, the ordinary camera can be used to take photographs of clusters and the regions in the Milky Way, where the separate stars are wholly invisible to the naked eye. More exact work can be done with a photographic telescope of the smallest size, but this requires accurate clockwork to move it. There is, however, no difficulty in taking photographs of any star visible to the naked eye without any motion of the telescope. It must be remembered that the ordinary visual telescope is not that best adapted for photographic work. The latter requires either to have a special object-glass suitable for bringing the photographic rays to a focus, or to be supplied with a corrector, which consists of a separate lens which placed over the object-glass will enable it to produce the necessary effect of bringing the photographic rays alone to a focus.

SIMON NEWCOMB.

PHOTO-LITHOGRAPHY. See PHOTOGRAPHY, Vol. XVIII, pp. 833, 834.

PHOTOMETER. See GAS, Vol. X, pp. 99, 100.

PHOTOPHONE, same as RADIOPHONE. See TELEPHONE, Vol. XXIII, pp. 130, 134.

PHOTOSPHERE. See SUN, Vol. XXII, p. 645.

PHOTOSYNTAX OR PHOTOSYNTHESIS, a term used in plant physiology to indicate the process often called carbon-assimilation. It is the first step in the assimilation of food by green plants, and consists in the construction of a carbon-molecule, which contains hydrogen and oxygen out of carbon dioxide and water through the agency of chlorophyll and light. It is the well-nigh universal method by which organic material is constructed from inorganic material, and hence holds a very important relation to the existence of plants and animals.

PHOTOTAXIS, a term used in plant physiology to indicate a certain result of irritability to the direction of incidence of the rays of light, being a phase of heliotropism. When light falls obliquely upon the motile spores (zoöspores) of certain algæ, they arrange themselves in the water so that their long axes are parallel to the direction of incidence, this phenomenon being called phototaxis. When they move, they move in the line of incidence; if away from the source of light, they are said to be negatively phototactic; if toward the source of light, they are positively phototactic.

PHRAATES, the name of five Parthian Kings. See PERSIA, Vol. XVIII, pp. 590, 594-596, 598, 600.

PHRAGMITES. See REED, Vol. XX, p. 319.

PHRANTZES GEORGIUS. See BYZANTINE HISTORIANS, Vol. IV, p. 614.

PHRAORTES, a Median king. See PERSIA, Vol. XVIII, pp. 562, 563.

PHRAORTES, an usurper. See PERSIA, Vol. XVIII, p. 569.

PHRATRIES. See TOTEMISM, Vol. XXIII, pp. 472-474.

PHRYGIAN RELIGION AND LANGUAGE. See PHRYGIA, Vol. XVIII, p. 853.

PHRYNIDES. See ARACHNIDA, Vol. II, pp. 289, 290.

PHTHA OR PTAH. See EGYPT, Vol. VII, p. 717.

PHYCOMYCETES. See FUNGUS, Vol. IX, pp. 830, 831.

PHYLLOCACTUS. See HORTICULTURE, Vol. XII, p. 265.

PHYLLOME. See BOTANY, Vol. IV, p. 108.

PHYLLPODA. See CRUSTACEA, Vol. VI, pp. 663-665.

PHYLLOPTERYX. See HIPPOCAMPUS, Vol. XI, p. 852.

PHYLLORHININÆ. See MAMMALIA, Vol. XV, p. 412.

PHYLLOSTOMIDÆ. See MAMMALIA, Vol. XV, pp. 414, 415.

PHYLLOTAXIS. See BOTANY, Vol. IV, pp. 115-118.

PHYLLXERA. See VINE, Vol. XXIV, pp. 238-240.

PHYLOGENY, in natural history the study of the descent of an individual tribe. See ANCESTRY OF PLANTS and HEREDITY, both in these Supplements.

PHYSALIS, a genus of plants belonging to the family *Solanaceæ*, and closely related to the genus *Solanum*, to which the potato and tomato belong. The species of *Physalis* are commonly called ground cherries, on account of their berry-like fruit, which often resembles a cherry in color and size, and is inclosed in the persistent inflated calyx.

PHYSETERIDÆ. See MAMMALIA, Vol. XV, pp. 395, 396.

PHYSICAL EDUCATION. See GYMNASIUM, Vol. XI, pp. 347, 348; GYMNASTICS, Vol. XI, pp. 348-350.

PHYSICAL GEOGRAPHY. See GEOGRAPHY, Vol. X, pp. 210-212.

PHYSICK, PHILIP SYNG, an American surgeon;

born in Philadelphia, Pennsylvania, July 7, 1768; graduated at the University of Pennsylvania in 1785; studied medicine in Philadelphia and London, receiving in 1790 the appointment of house surgeon at St. George's Hospital; received his license from the Royal College of Surgeons in London in 1791, and was given his degree by the University of Edinburgh in 1792. He began practicing in Philadelphia during the yellow-fever epidemic of 1793, and in 1794 was elected surgeon of the Pennsylvania Hospital. From that time until 1831 he filled various medical appointments, being president of the Phrenological Society of Philadelphia in 1822, and in 1824 president of the Philadelphia Medical Society. In 1825 he was elected a member of the French Academy of Medicine, and in 1836 was made an honorary fellow of the Royal Medical and Chirurgical Society of London. He introduced many valuable improvements in the treatment of disease, and invented modifications of surgical instruments. He died in Philadelphia, Dec. 15, 1837.

PHYSIOCRATS. See POLITICAL ECONOMY, Vol. XIX, pp. 359-362.

PHYSIOLOGICAL CHEMISTRY. Physiological chemistry deals with the chemical changes which go on in the structures of living organisms. It includes both plant and animal chemistry. Of course the chief interest centers in the processes going on in the human body. Yet the opportunities for studying the cause, course and result of these changes and for modifying them by experiment are so very limited in the human subject that a large part of our knowledge of human physiology has been obtained by means of observations on animals.

In recent years very extensive studies in the relative values of various foods for the support of life have been made, one of the objects in view having been the regulation of diet, so that by proper selection of foods the maintenance of life in full activity may be secured at the smallest possible expense. It is a common phenomenon to find families earning large wages purchasing their supplies so injudiciously that they are actually suffering from slow starvation in respect of certain essential elements of nourishment, such as fats, proteids or lime. The food most perfectly adapted to the early period of life is the mother's milk. The adjustment of its constituents to the work it has to do is very remarkable. The inorganic substances, such as salts of potassium, sodium, magnesium calcium, phosphorus and chlorine (excepting only iron), which dog's milk, for example, contains, are present in exactly the same proportions as in the body of the pup which it is supporting. If a similar adjustment could be maintained throughout life, much expense and much wear and tear of the digestive organs might be spared.

Among the elements present in the body, in very small amount, iodine has acquired a new significance. It has been recognized that cretinism, a condition of mental weakness and physical degeneracy common among the inhabitants of Alpine districts, is closely connected with very small development of the thyroid gland. Feeding cretins with

sheep's thyroids (sweetbreads) was found to produce a wonderful amelioration of the symptoms. It now appears that iodine in some form of organic combination is an essential constituent of the healthy thyroid, and that it is the absence of this constituent which causes the disease referred to.

The organic compounds found in the body yield very slowly to chemical investigation, on account of their complex character or their instability. Some light has been thrown on the proteids. These are amorphous bodies such as blood, fibrin and casein, containing nitrogen and sulphur. Substances having very similar properties have recently been made artificially, but they do not seem to contain sulphur. If this should lead to the synthesis of a real proteid, a region of physiological chemistry at present very obscure would be brought much more completely within the range of chemical investigation. One of the most important products excreted by the animal body is uric acid, $C^5H^4N^4O^3$. In a healthy man the proportion of the nitrogen which he takes up in his food and eliminates in this way is comparatively small. Its overproduction leads to painful diseases, like gout. In animals like the cat and dog it is almost absent from the excreta, while in birds and reptiles it often forms the chief means of exit for the nitrogen. Its constitution is known, and its recent preparation artificially from aceto-acetic ether and urea must be regarded as a discovery of the first importance.

Adenine is a new base found in the substance of the cell nuclei. Its formula, $C^5H^5N^9$, indicates that it is a polymer of prussic acid. This and the three other bases found in the nuclei are interesting, as they are probably intermediate steps in the formation of urea or uric acid.

The study of the poisonous substances produced by animals and plants is of great interest from the medical point of view. Thus it is estimated that thousands of human beings perish yearly from snake-bites. A study of the effects of snake-poison has shown that careful injection of gradually increasing quantities enables the animal so treated finally to withstand doses five or six times that ordinarily sufficient to produce death. Not only so, but the blood serum of animals thus immunized acquires the properties of an antidote to the poison, and when injected into a rabbit (e.g.) with, or even after the snake-poison, entirely prevents death or even serious symptoms of any kind. The prepared serum, which has been called antivenene, seems to act chemically, destroying the harmful substances. The exact nature of the latter has not been determined, but they seem to resemble the albumens, and are called tox-albumens.

The production of poisonous secretions is not confined to animals like snakes, scorpions and spiders. In fact, death from the effects of the toxic substances produced by bacteria is far more common. Thus the bacilli of diphtheria and tetanus, and those found in putrifying organic matter, form poisons of extreme virulence. The latter are often called ptomaines. The efforts to separate pure chemical substances from liquids in which bacilli are growing, or from decaying flesh or vegetable products, have

frequently been successful. Thus, methylguanidine $\text{NH}=\text{C}<\begin{smallmatrix} \text{NH}^2 \\ \text{NHCH}^3 \end{smallmatrix}$ was isolated from horseflesh four months old, and tetramethylenediamine (putrescine) and pentamethylenediamine (cadaverine) from other decaying substances. But they were found to be either non-poisonous, as in the last two cases, or greatly inferior in this respect to the crude material from which they were extracted, as in the first. Tetanine, a base extracted from cultures of tetanus bacilli, was poisonous to the extent that 0.5 grams was fatal to a guinea-pig; but the crude organic matter contained in the filtered culture-medium was so much more virulent a poison that, in spite of its undoubtedly containing much non-poisonous matter, one twentieth of the above amount would have been sufficient to poison a thousand guinea-pigs. The most actively poisonous substances seem to have been decomposed in the process of extraction. They are regarded as being similar to the corresponding bodies in snake-poison, and are classed as tox-albumens.

ALEXANDER SMITH.

PHYSIOLOGY, ANIMAL. See EMBRYOLOGY, in these Supplements.

PHYSIOLOGY, VEGETABLE. See PHYSIOLOGY, Vol. XIX, pp. 43-63.

PHYSOSTOMI. See ICHTHYOLOGY, Vol. XII, pp. 692-694.

PHYTOPHTHIRE. See HEMIPTERA, Vol. XI, p. 646.

PHYTOZOA. See BOTANY, Vol. IV, p. 140.

PIA MATER. See ANATOMY, Vol. I, p. 865.

PIANO, ELECTRIC. The instrument known by this name is rather a piano with an automatic electric attachment. It is applicable to any ordinary form of upright piano, and is operated by a little motor, set in the base of the instrument and supplied with a current of about ten amperes and five volts. It makes use of standard perforated music, such as is manufactured for several other instruments. A music-holder containing the perforated rolls is placed directly below the keyboard, and the music-rolls are unrolled by means of belts connecting with the motor. Electric contacts are provided to connect with each note, and when the perforation for a certain note passes under its contact a circuit is closed and an electric magnet put into operation. The magnet, through the medium of several minor connecting devices ending in a striker-arm, raises the inner end of the key, and of course depresses the outer end just as a player would do. A drum, extending the whole length of the piano at the base, operates friction-shoes whenever a contact is made, and the shoe turns a bell-crank that pushes a lever against the striker-arm. The operation of the piano by hand is not interfered with in the least, and the perforated music thus mechanically rendered may be written with more notes in the chords than it would be possible for a performer to sound with ten fingers. The music is re-rolled automatically, and the speed or tempo is regulated by moving a little switch, which shifts a belt working on two cone-pulleys, so that a change in time is necessarily gradual.

C. H. COCHRANE.

PIANOGRAPH. An instrument designed to be attached to a pianoforte, and to record graphically the music played. Carpentier's prints lines of varying length, showing where holes should be cut in the sheet for its subsequent use in an electric piano or other automatic instrument. Parise's instrument is a sort of typewriter attachment, designed to print the notes as ordinarily written, except the stems, quavers, etc., which have to be added by hand. By its use a composer may read his improvisation as soon as it has been played. The arrangement consists of a series of levers extending from the keys and connecting with small rods which reach the cylinder of the pianograph proper. This cylinder bears a roll of paper, and as the player strikes the keys the rods strike the paper through an inked ribbon, making the record.

PIASSABA or PIACABA, a remarkable vegetable fiber which has become an article of much importance. It is procured from Brazil, chiefly from the ports of Para and Maranhã, and is produced by one or more species of palm. That which furnishes the greater part is the coquilla-nut palm (*Attalea funifera*); but Mr. Wallace states that much of it is procured from a species of *Leopoldinia*, which he has named *L. piassaba*. This material has been found of great utility in making brushes of a coarse kind, particularly those required for sweeping streets.

PIATT, JOHN JAMES, an American poet; born in Milton, Indiana, March 1, 1835. After working in a printing-office, he studied at Kenyon College, and also at Capitol University, Ohio; contributed to the *Louisville Journal*, and became private secretary to the editor, George D. Prentice. He was a clerk in the Treasury Department at Washington, and then until 1870 was occupied in journalistic work in Cincinnati, Ohio, and in this year was appointed clerk to the United States House of Representatives, and the following year librarian to the House. He was United States consul at Cork from 1882-94. He wrote a number of volumes of verses, his first being written in conjunction with W. D. Howells, and entitled *Poems of Two Friends*; and with his wife, SARAH MORGAN BRYAN, *The Nests at Washington* (1864). He subsequently published *Poems in Sunshine and Firelight* (1866); *Western Windows, and Other Poems* (1869); *Landmarks* (1871); *The Lost Farm* (1877); *Poems of House and Home* (1878); *Pencilled Fly-Leaves*, essays (1880); *Idyls and Lyrics of the Ohio Valley* (1881); *At the Holy Well* (1887); *Lost Hunting Grounds* (1893). Mr. Piatt's verses have been well received both in his native country and in Great Britain. Lowell wrote of them sympathetically, discovering in them a "native sweetness and humanity, a domesticity of sentiment that is very attractive." His wife (born in Lexington, Kentucky, Aug. 11, 1836; married in 1861) published some volumes of poetry, including *A Woman's Poems* (1871); *A Voyage to the Fortunate Islands* (1874); *That New World* (1876); *Poems in Company with Children* (1877); *Dramatic Persons and Moods* (1880); *An Irish Garland* (1884); *In Primrose Time* (1886); *Child's World Ballads* (1887); *The Little Emigrants* (1887); *The Witch in the Glass*

(1889); *An Irish Wild Flower* (1891); *An Enchanted Castle* (1893); *Poems* (2 vols., 1894).

PIATTI, ALFREDO, an Italian violoncellist; born in Bergamo, Jan. 8, 1822; had in his youth the advantage of instruction from his grand-uncle, Zanetti, and was able to begin playing in the orchestra at the age of 7. He entered the Milan Conservatoire in 1832, studied under Merighi, and made his public appearance as a solo performer in 1837. He went to England in 1844, making his first appearance at a concert of the Philharmonic Society in June of that year in a concertino by Kummer, his performance at once establishing his position in the front rank. He obtained this success notwithstanding the fact that at this concert Mendelssohn had preceded him, playing Beethoven's *PF. Concerto in G*. He and Mendelssohn played several times together in private, and Piatti is thought to have completed for Mendelssohn the first movement of a concerto for violoncello and orchestra, but the manuscript has never been found. Signor Piatti composed a concertino and two concertos for violoncello obligato of great merit.

PIAZZI, GUISEPPi, an Italian astronomer. See ASTRONOMY, Vol. II, pp. 758, 806.

PIBROCH, a form of music performed on the bagpipe of the Highlanders, including marches and dirges. Its martial character has been found to have a wonderful power in arousing their military instincts. Its rhythm is so irregular, and its notes in the quicker parts so much jumbled together, that a stranger has difficulty in following the modulations or reconciling his ear to them. The earliest mention of the military music of the bagpipe is in 1594, at the battle of Balrinnies. According to Sir Walter Scott, the connoisseurs in pipe-music affect to discover in a well-composed pibroch the imitative sounds of march, conflict, flight, pursuit, and all the current of a heavy fight. Many remarkable instances have been recorded of the effect of the pibroch on the Highlanders.

PICARD, ALFRED, a French civil engineer, born in Paris, Dec. 21, 1844; graduated in 1864 at the École des Ponts et Chaussées; engineer-in-chief in 1880; inspector-general of the first class in 1891; and honorary director-general of the commission of bridges and roads, and of mines and of railways; president of the consulting commission on railways, etc. He was editor of the official reports of the Exposition of 1889, and vice-president of the international railway congress that met at St. Petersburg in 1892. He was a grand officer of the Legion of Honor, and a commissioner-general of the Universal Exposition of Paris of 1900.

PICARD, JEAN, an astronomer (1620–82). See ASTRONOMY, Vol. II, p. 755.

PICARDS. See ADAMITES, Vol. I, p. 140.

PICCOLOMINI, OCTAVIO, Duke of Amalfi, an Austrian prince; born in 1599, of a distinguished family which settled at Siena and afterward obtained possession of the duchy of Amalfi. The family became celebrated by its production of writers and warriors, of a pope, Pius II (see Vol. XIX, p. 152), and several cardinals. Octavio entered the Spanish service, and as captain of a Florentine cavalry regi-

ment was sent to aid Ferdinand II against the Bohemians, being present at the battle of Weissemburg (1620). He especially distinguished himself at the battle of Lützen, his cavalry regiment claiming to have fired the shot that killed Gustavus Adolphus (1632). Two years later he was attached to Wallenstein's command. Becoming intimate with that general, who confided to him his aspirations to the Bohemian throne, Piccolomini communicated his knowledge to Ferdinand, and was instrumental in bringing about the downfall of Wallenstein, receiving as his reward a portion of the fallen general's estate. Piccolomini in this year again distinguished himself, at the battle of Nördlingen, and in 1835 was sent to the Netherlands in aid of the Spaniards. Until 1648, when the peace of Westphalia was signed, Piccolomini was engaged in the Netherlands and in Sweden. Though he suffered a severe defeat in Silesia, at the battle of Torstensohn (1640), at the hands of the Swedes, he was victorious against the French and Dutch in the Netherlands. After the peace of Westphalia he was made a field-marshal by the Emperor, and in 1649 was sent as a plenipotentiary to the Congress of Nuremberg, when he was raised to the dignity of prince of the empire. The Spanish monarch conferred upon him the order of the Golden Fleece. He died childless, in Vienna, Aug. 10, 1640; so that the "Max" represented as his son in Schiller's *Wallenstein* is a poetical fiction.

PICEA. See FIR, Vol. IX, pp. 224, 225.

PICHICIAGO. See CHLAMYDOPHORE, Vol. V, p. 676.

PICHINCHA, a mountain. See ECUADOR, Vol. VII, p. 645.

PICHURIM BEANS, a name given to the large cotyledons of *Nectandra pichury*, a South American plant belonging to the family *Lauraceæ*. These "beans" have a sassafras-like flavor, and are used in confections.

PICIDÆ. See WOODPECKER, Vol. XXIV, p. 651.

PICKARD—CAMBRIDGE, OCTAVIUS, an English clergyman and scientist; born in Bloxworth Rectory, Dorsetshire, Nov. 3, 1828; was a student at the Middle Temple, London (1849–52), and at University College, Durham (1855–58); M.A. (1859); ordained deacon (1858), and priest (1859); became rector of Bloxworth and Winterbourne Tomson in 1868; and was elected a F.R.S. in 1887. He wrote *Spiders of Dorset* (1879–81); *Araneidea*, in *Scientific Results of the Second Yarkand Mission* (1885); *Arachnida of Kerguelen Island* (1877); and the article ARACHNIDA, in this *ENCYCLOPÆDIA*.

PICKENS, ANDREW, an American soldier; born in Paxton, Pennsylvania, of Huguenot parents, with whom he removed to South Carolina in 1742. He joined Colonel Grant's expedition against the Cherokees in 1761, and in the War of the Revolution entered the American army as a captain, and rose by his gallantry to be brigadier-general. In February, 1779, with only four hundred men, he defeated a force of Tories under Colonel Boyd at Kettle Creek; and in 1781, at the battle of Cowpens, Jan. 17, rallied the militia after they had been compelled to retreat, for which act of gallantry Congress

afterward awarded him a sword. In 1782 he settled at Hopewell, upon a large tract of land acquired from the Cherokees. He became a member of the state legislature, and entered Congress in 1793. He was appointed major-general of militia in 1795; was a member of the convention which adopted the state constitution, and was elected on various occasions to arrange treaties with the Indians. He died in Hopewell, Aug. 17, 1817.

PICKENS, FRANCIS WILKINSON, an American public man, grandson of the preceding; born in Togadoo, South Carolina, April 7, 1805; educated at South Carolina College; admitted to the bar in 1829. In the legislature he was a prominent tariff nullifier, but was against the secession movement of 1844. He was a member of Congress from 1834 to 1843, United States minister to Russia from 1858 to 1860, and then governor of the state. He died in Edgefield, South Carolina, Jan. 25, 1869.

PICKEREL. See PIKE, Vol. XIX, p. 89.

PICKERING, CHARLES, an American naturalist; born on the North Branch of the Susquehanna, Pennsylvania, Nov. 10, 1805; a grandson of Colonel Timothy Pickering; educated at Harvard University, graduating at the Boston Medical College. He removed to Philadelphia to practice his profession, at the same time becoming a contributor to the journals of scientific societies. He was an active member of the Academy of Natural Sciences of Philadelphia. He was appointed a member of the United States exploring expedition which returned to Washington in 1841. In 1843 he set out by himself for Malta, and visited the Red Sea, Zanzibar and India, returning after an absence of 22 months. As a result of his investigations, he published *The Races of Man and their Geographical Distribution* (1848), republished in London. This was followed by *The Geographical Distribution of Animals and Man* (1854); *The Geographical Distribution of Plants* (1861); *Chronological History of Plants: Man's Record of his own Existence, Illustrated through their Names, Uses and Companionship* (1879). He died in March, 1878.

PICKERING, EDWARD CHARLES, an American astronomer; born in Boston, July 19, 1846; graduated at Lawrence Scientific School of Harvard in 1865, and was appointed the following year assistant instructor in physics at the Massachusetts Institute of Technology, becoming, in 1868, full professor, and retaining the position until 1877. In 1869 he was sent to Iowa on behalf of the United States *Nautical Almanac* office to witness the eclipse of the sun, and the following year had charge of the United States Coast Survey expedition to Xeres, Spain, to observe the eclipse of December 22d. He became professor of astronomy and geodesy and director of the observatory of Harvard University in 1876; he was an associate of the Royal Astronomical Society of London, and in 1886 was awarded its gold medal for his photometric researches; was a member of the National Academy of Sciences of America, and in 1887 received the Henry Draper medal for his work on astronomical physics. In 1876 he was vice-president of the American Association for the Advancement of Science. He was instrumental in

establishing, under the auspices of Harvard University, an auxiliary observatory in Peru, at Arequipa, altitude 16,275 feet. His published papers and reports number over a hundred; he wrote *Elements of Physical Manipulation* (1873-76); and edited *The Theory of Colour in its Relation to Art and Art Industry*, by Dr. William Von Bezold (1876). For his system of photometry, see PHOTOMETRY, Vol. XVIII, p. 841.

PICKERING, JOHN, an American scholar; born in Salem, Massachusetts, Feb. 7, 1777; was a son of Colonel Timothy Pickering; graduated at Harvard in 1796; studied law and became secretary to the United States legation to Portugal, and to the minister to Great Britain (1799-1801); after which he returned to Salem, resuming the practice of law, which he prosecuted until 1829, and removed to Boston, where he became city solicitor, holding the office until a short time previous to his death. He served three terms in each house of the state legislature, was a member of the governor's council, and in 1833 one of the commissioners for revising the state laws. He was the first president of the American Oriental Society, and was one of the first scholars of his time. His publications include *A Vocabulary, or Collection of Words and Phrases which have been Supposed to be Peculiar to the United States* (1816); *On the Adoption of a Uniform Orthography for the Indian Languages of North America* (1820); *Remarks on the Indian Languages of North America* (1836); *A Comprehensive Lexicon of the Greek Language*, which may be considered his most important work, and which he strove to perfect. It appeared in 1826, and ran through many editions. He died in Boston, May 5, 1846.

PICKERING, PERCIVAL SPENCER UMFREVILLE, an English scientist; born in London, March 6, 1858; educated at Eton, from which he obtained in 1875 an exhibition in science at Balliol College, and in 1880 took first-class honors in natural science at Oxford, and was lecturer in chemistry at Bedford College in 1881-89. He was elected a fellow of the Royal Society in 1890. Wrote voluminously on subjects connected with chemistry. His writings include *The Constitution of Molecular Compounds* (1883); *The Nature of Solution* (1886); *The Thermal Phenomena of Neutralization* (1887); *The Principles of Thermochemistry* (1888); *Determinations of the Heat Capacity and Heat of Fusion of Some Substances* (1890); *The Heat of Dissolution of Gases in Liquids* (1892); *Examination of the Properties of Calcium Chloride Solutions* (1894).

PICKERING, TIMOTHY, an American statesman; born in Salem, Massachusetts, July 15, 1745; graduated at Harvard in 1763; received a commission as lieutenant of militia in 1766; occupied several offices, including that of town clerk; studied law, and was admitted to the bar in 1768. After the battle of Lexington, Colonel Pickering, with 700 Essex militia, nearly succeeded in capturing the British force just as it managed to escape into Charlestown under cover of the fleet. He became a member of the legislature in 1776; joined the Continental army with his Essex militia, and next year became adjutant-general and a member of the

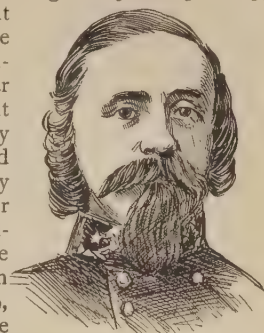
board of war. In 1780 he was made quartermaster-general, holding the office until it was abolished five years later. In 1786 he was sent by the Federal government to settle the dispute between Connecticut and Pennsylvania as to land-titles in the valley of Wyoming, Pennsylvania. In this region he acquired valuable property, but in his endeavors to secure harmony he became involved in the local troubles and was seized and confined for three weeks by a gang of masked men. He was the delegate from Luzerne County to the State Constitutional Convention of 1789-90; was appointed in the latter year by Washington to negotiate a treaty with the Six Nations. The following year he was made Postmaster-General, holding the office until 1795, when he became Secretary of War. He was then Secretary of State, in 1795-1800. The military academy at West Point was founded chiefly through his efforts, in 1802. After his retirement from the cabinet he returned to Wyoming Valley, and lived in a log-house. He was then in financial embarrassment; learning which, his friends in Boston purchased part of his land, which enabled him to free himself from debt. Returning to Massachusetts, he was appointed judge of a common-pleas court in 1802; elected to the United States Senate to fill a vacancy in 1803, and then for a term of six years, in 1804. At the end of his term he was defeated for re-election, but was sent as a Representative in 1814, and refused a re-election to the Senate in 1816. He was a member of the governor's council in 1817. He was a strong Federalist; was opposed to the Louisiana land-purchase, the embargo of 1807, and the War of 1812; but served as a commissioner for the defense of the Massachusetts coast. He wrote numerous letters and pamphlets on the political events that occurred during his political career. He died in Salem, Jan. 29, 1829.

PICKERING, WILLIAM HENRY, an American astronomer, brother to Edward Charles Pickering and great-grandson of Timothy Pickering; born in Boston, Feb. 15, 1858; graduated at the Massachusetts Institute of Technology in 1879, and next year was appointed instructor in physics in the same institution. In 1887 he was appointed to take charge of the Boyden department of the Harvard observatory; in 1882 organized, in connection with the Institute of Technology, a laboratory for teaching dry photography; in 1878 observed the solar eclipse from Colorado; and in 1886 was in charge of an expedition to the West Indies to observe the total eclipse of that year. The year following he went to Colorado to make astronomical observations for the purpose of securing the most suitable site for an observatory. He published *Walking Guide to the Mount Washington Range* (1882), etc.

PICKERSGILL, FREDERICK RICHARD, an English painter; born in 1820. He studied at the Royal Academy, of which he was elected a member in 1857. His *Combat between Hercules and Archelaus* and *The Death of King Lear* made him famous. His magnificent *Burial of Harold* won a prize in 1847, and was secured for the House of Parliament; and his *Amoret, Emelia and Prince Arthur* is in the National

Gallery. He was Keeper of the Royal Academy from 1873 to 1887.

PICKETT, GEORGE EDWARD, an American soldier; born in Richmond, Virginia, Jan. 25, 1825; graduated at West Point in 1846, and entered the army as brevet second-lieutenant. He was in the war with Mexico, being present at the capture of the City of Mexico; was transferred to the infantry in July 1847; and in September breveted captain for gallantry at Chapultepec. He then served on garrison duty in Texas from 1849, becoming captain of the Ninth Infantry early in 1855. The year following



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he was on duty at Puget Sound, and rendered valuable service in connection with the northwest boundary dispute with Great Britain, for which Congress passed resolutions thanking him. June 25, 1861, he resigned his commission in the army. On reaching Virginia he was commissioned colonel in the Confederate army, and assigned to duty on the Rappahannock River. He was made brigadier-general in February, 1862, his brigade being known as the "game-cock brigade." At Gaines's Mill, June 27, 1862, he was severely wounded. On his recovery he was made major-general, with a division of Virginians, which at Fredericksburg held the center of Lee's line. At Gettysburg, July 3, 1863, his division led the assault. He had also a command at the capture of Plymouth, April 20, 1864; and in May prevented the capture of Petersburg by General Benjamin F. Butler. At Five Forks, April 1, 1865, he made a brave stand, but his division was cut to pieces. After the war he returned to Richmond, engaging in the life-insurance business. He died in Norfolk, Virginia, July 30, 1875.

PICKNELL, WILLIAM LAMB, an American artist; born in Hinesburg, Vermont, Oct. 23, 1854; went to Europe and became a pupil of George Inness in Rome during 1873-75, and with Jean Gérôme in Paris in 1875-77; then lived in Brittany for four years, studying under Robert Wylie; and returned in 1882 to the United States. In 1880 he received an honorable mention at the Paris Salon, and was elected a member of the Society of American Artists; received medals in Boston in 1881 and 1884; and in the latter year was elected to the Society of British artists. Among his works are *Breton Peasant Girl Feeding Ducks*, Royal Academy (1877); *The Fields of Kerran*, Paris Salon (1878); *On the Border of the Marsh*, Boston Academy of Fine Arts (1880); etc.

PICO, island. See AZORES, Vol. III, p. 172.

PICOTEES. See PINK, Vol. XIX, p. 107.

PICRIC OR CARBAZOTIC. See CARBOLIC ACID, Vol. V, p. 85.

PICRITE, same as PERIDOTE, Vol. XVIII, p. 534.

PICROTOXINE, a very poisonous bitter substance found in *Cocculus indicus* (fishberries) and

other varieties of *Anamirta*. It forms colorless needles, soluble in alcohol and hot water, but slightly soluble in cold water, ether or chloroform. It is doubtful whether it is a simple substance or a mixture. It is used externally to cure porrigio, and has been given internally or by subcutaneous injection, in epilepsy.

PICTON, a town and port of entry of Prince Edward County, Ontario, Canada; situated on the Bay of Quinté, 35 miles W.S.W. of Kingston; has Ontario College and a few manufactories. Population 1890, 4,000.

PICTOU, a town and the capital of Pictou County, Nova Scotia, and a port of entry on Northumberland Strait, at the head of Pictou Harbor, on the Intercolonial railroad, 113 miles N.N.E. of Halifax. It has a good harbor, coal is mined in the vicinity, and the town possesses shipyards and several manufacturing industries. Population 1891, 2,999.

PICTS. See BRITANNIA, Vol. IV, p. 353; also SCOTLAND, Vol. XXI, p. 473.

PIDGIN OR PIGEON-ENGLISH. See CANTON, Vol. V, p. 38.

PIEDMONT, a village of Mineral County, central northeastern West Virginia, 170 miles E. of Wheeling, on the north branch of the Potomac, and on the Baltimore and Ohio and the Cumberland and Pennsylvania railroads. It has repair-shops of the Baltimore and Ohio railroad, employing several hundred men; coal is mined in the vicinity. Population 1890, 3,500.

PIEDMONT PLAIN, same as ATLANTIC PLAIN. See NORTH CAROLINA, Vol. XVII, p. 559; also UNITED STATES, Vol. XXIII, p. 796.

PIERCE, GEORGE FOSTER, an American clergyman; born in Greene County, Georgia, Feb. 3, 1811; graduated at Franklin College, Athens, in 1829; studied law, but preferred theology, and in 1831 joined the Georgia conference of the Methodist Episcopal Church. He became a popular preacher, and presiding elder of the District of Augusta in his sixth year of ministry. He was elected president of Emory College in 1848, and ordained a bishop in 1854. He published *Incidents of Western Travel* (1857). He died in Sparta, Georgia, Sept. 3, 1884.

PIERCE CITY, a village of Lawrence County, southwestern Missouri, 50 miles S.W. of Springfield, on the St. Louis and San Francisco railroad; has two large flour-mills, wagon-shops, limekilns, and a pottery. Population 1890, 2,511.

PIERMONT, a village of Rockland County, southeastern New York, four miles S. of Nyack, just N. of the Palisades, on the west bank of the Hudson, and on the New York Central and Hudson River railroad; contains handsome residences, and has four churches, a pier one mile long, railroad repair-shops and an iron-foundry. Population 1890, 1,219.

PIEROLA, NICOLAS DE, a South American soldier; born in Arequipa, Peru, Jan. 5, 1839. Educated as a lawyer, he early interested himself in the politics of his country, and in 1869 was appointed minister of finance. At the end of his administration he was impeached, and, although acquitted, went into exile in Chile. In 1874 and 1877 he organized expeditions against the Peruvian govern-

ment, but was unsuccessful. The second time he surrendered and was banished. At the outbreak of the Chilean War he proffered his services to General Prado, then President of Peru, but they were declined. After General Prado retired, General Pierola assumed the charge of affairs, and continued the fighting. In January, 1881, he abandoned Lima, and in the following November retired from the government. In 1882 he visited Europe and the United States; in 1885 made another attempt to secure the Presidency, but was banished; was again a candidate in 1894, but was defeated. The following year, however, Pierola overthrew the Cáceres government, and July 27 was elected President, and inaugurated amid great popular enthusiasm September 8.

PIERPONT, JOHN, an American poet; born in Litchfield, Connecticut, April 6, 1785; graduated at Yale College in 1804; commenced to practice law in 1812 at Newburyport; entered the Theological School of Harvard University in 1816; and in 1819 was ordained pastor of the Hollis Street Church, remaining there 19 years, when, some differences arising between him and the congregation, he resigned. After residing in Boston he was, in 1845, called to the Unitarian Church in Troy, New York; and in 1849 took charge of a church at Medford, Massachusetts. In 1861 he became chaplain to the Twenty-second Massachusetts Infantry, and later accepted a clerkship in the Treasury Department at Washington, during the next four years compiling in one volume a *Digest of the Decisions and Instructions of the Treasury Department, to Collectors of Customs*, a work of inestimable value. From 1823 to 1854 he published a series of class readers, which were extensively used. But his fame rests on his volume of poems entitled *Airs of Palestine*, the first edition of which appeared in 1816. This work was well received by the critics in America and in Great Britain. New editions appeared until 1854. He died in Medford, Massachusetts, Aug. 27, 1866.

PIERRE, a city and the capital of South Dakota and of Hughes County, in the central part of the state, on the Missouri, at the mouth of the Bad River, and on the Chicago and North-Western railroad. Originally there was an Indian post here, but the town was settled several years ago, and after a stubborn contest Pierre was designated as the permanent capital of the new state of South Dakota. Buildings for the accommodation of the legislature and the state officers have been erected; a United States Indian Industrial School and Pierre University (Presbyterian) are located here. In 1895 the latter institution had 11 instructors and 98 students. Population 1890, 3,235; 1895, 1,776.

PIERREPONT FAMILY, THE, was descended from JOHN (son of James Pierrepont of London, England), who settled in Roxbury, Massachusetts, before the Revolution, and who was a representative to the general court in 1672, and died in December, 1690.—His son JAMES was born in Roxbury, in 1659; graduated at Harvard, in 1681, and became pastor of the church at New Haven. In 1698 he, with two other ministers, formulated a plan for a college, which materialized in the

founding of Yale College two years later. He was the most distinguished of the early clergymen of New England. He died in New Haven, Connecticut, Nov. 14, 1714.—His grandson, HEZEKIAH BEERS, was born in New Haven, Connecticut, in 1768; was educated for commercial pursuits, and became agent for Watson and Greenleaf of Philadelphia in their purchase of the national debt. Having acquired a fortune in this transaction, he founded the firm of Leffingwell and Pierrepont, that did a large business shipping provisions to France during the Revolution, until American ships were seized by Great Britain. By his marriage in 1802 with Anna, daughter of William Constable, a New York merchant, he came into possession of 500,000 acres of wild lands in the northern part of the state. Two years after his marriage he purchased the Benson farm on Brooklyn Heights, where he resided, devoting himself entirely to the development of his estate. On the site of this farm the city hall and other public and private buildings of the city of Brooklyn were afterwards erected. He died in Brooklyn, in 1838.—His eldest son, WILLIAM CONSTABLE, was born in New York City, Oct. 3, 1803; was educated with a view to taking charge of his father's property, becoming agent for the same in 1820. He was famed as a mathematician, and corresponded with many of the famous mathematicians of the time. He received the degree of LL.D. from Hobart College in 1871. He died in the Pierrepont manor, Jefferson County, New York, Dec. 20, 1885.—His brother, HENRY EVELYN, was born in Brooklyn, New York, Aug. 8, 1808; assisted in the management of his father's estates. He traveled in Europe in 1833, and on his return, Brooklyn having become incorporated, was appointed a commissioner to lay out plans for the city. He converted Gowanus Hills into a cemetery, and in 1838 obtained a charter for the Greenwood Cemetery Company. He improved the Brooklyn property, creating Furman street, and secured five acres of wharf property by erecting a new bulkhead on the water-front. He died in Brooklyn, March 28, 1888.—James Pierrepont's grandson, EDWARDS, was born in North Haven, Connecticut, March 4, 1817; graduated at Yale in 1837, and at the law school in 1840. Removing to New York City in 1845, he became eminent at the bar. He was elected a judge of the superior court of the city of New York in 1857, resigning in 1860. In 1862 he was appointed, with General Dix, to try the cases of parties confined in government forts and prisons. In 1864 he worked with the War Democrats for the election of Abraham Lincoln, and subsequently conducted the prosecution of J. H. Surratt, indicted for complicity in the assassination of the President. From 1869 to 1870 he was attorney-general of the southern district of New York, and was active in the opposition to the Tweed ring. In 1873 he was offered, but declined, the Russian ministry; he was Attorney-General for the United States in 1875 and 1876, and minister to Great Britain in 1876 and 1877.

He received among other honorary university degrees, that of D.C.L. from Oxford, England. He died Sept. 23, 1892.—His son, EDWARD, was born in New York City, June 30, 1860; graduated in 1882 at Oxford, England. After a year's travel in Europe he returned to the United States and entered Columbia Law School. In 1883 he traveled on the Pacific Coast, going as far as Alaska, and published, as a result, *From Fifth Avenue to Alaska* (1884). He was elected a fellow of the Royal Geographical Society of London, and in 1884 was appointed secretary to the legation at Rome, and, on the resignation of the minister, was made *chargé d'affaires*, and died in office, April 16, 1885.

PIERS. See HARBORS and DOCKS, Vol. XI, pp. 464, 465; also BRIDGES, Vol. IV, pp. 324-327.

PIERSON, ARTHUR TAPPAN, an American clergyman; born in New York City, March 6, 1837; graduated at Hamilton College in 1857, and at the Union Theological Seminary in 1860; was pastor of Congregational churches, and then of Presbyterian churches, becoming pastor of the church at Bethany, Philadelphia, in 1883, after which he supplied the Metropolitan Tabernacle, the late Rev. C. H. Spurgeon's church, London, 1891-93, and was Duff lecturer in 1892. He published *Many Infallible Proofs* (1886, 1889); *The Crisis of Missions* (1886); *Evangelistic Work in Principle and Practice* (1887); *Keys to the Word* (1887); edited *The Inspired Word* (1887); and *The Divine Enterprise of Missions* (1891); *The Miracles of Missions* (1891); *The Heart of the Gospel* (1891); *The Divine Art of Preaching* (1892); *The New Acts of the Apostles* (1894); and was editor of *The Missionary Review of the World*.

PIERS PLOWMAN. See LANGLAND, Vol. XIV, p. 285.

PIETERMARITZBURG, the capital of Natal, South Africa; situated in a plain watered by a tributary of the Umgeni; connected by rail with the Orange Free State and the Transvaal. The town takes its name from its Boer founders, Pieter Retisf and Gert Maritz. It is an English archbishop's see, and has a government house and other good public buildings. Population, 17,500.

PIETRA DURA. See INLAYING, Vol. XIII, p. 81.

PIEZOMETER, a device for measuring the effects of pressure on fluids; as a gauge for insertion into a water-pipe, the rise of the water in the gauge indicating the pressure of the water at the point of insertion; or a sounding-apparatus in which the pressure of water upon an air-tube gives the means of determining the depth to which the apparatus has descended. The name is also applied to a device for measuring the pressure of an explosion within a gun.

The Danish scientist, H. C. Oersted, invented a piezometer for measuring the compressibility of liquids, which was improved by Regnault. In Oersted's device there was a strong cylinder of glass, at the top of which was a piston working downward in it by means of a screw. Into this cylinder a jar was introduced, the neck of which

was elongated into a graduated capillary tube. This jar is to hold the liquid to be tested, which should fill it nearly to the graduated tube. A manometer is suspended in the cylinder, which, in turn, is filled with water. By turning the screw the piston is forced down upon the water, and the pressure thus created acts upon the liquid in the jar. The descent of the air-bubble in the graduated tube indicates the compression of the liquid in the jar, and the rise of water in Oersted's device, or of mercury in Regnault's in the manometer, indicates the pressure exerted by the piston. For greater accuracy a thermometer may be introduced into the cylinder for reading the temperature under pressure. In Regnault's device, where the pressure to be exerted is too great for the resistance of glass, steel tubes are employed, and the rise of the mercury in the manometer may be read by having it pass along a thin gold plating. The reading is from the extent to which the gold is amalgamated by contact with the mercury. See also MANOMETER, Vol. XV, pp. 494-496.

PIGAFETTA, ANTONIO, an Italian traveler (1491-1534). See MAGELLAN, Vol. XV, p. 198 (note).

PIGEON-ENGLISH. See CANTON, Vol. V, p. 38.

PIGEON-PEA, a popular name applied to species of *Cajanus*, a tropical genus of *Leguminosæ*, closely related to the true beans, and valued as a food-plant.

PIGMENTATION. See ANATOMY, Vol. I, p. 851.

PIGMY-APE. A name sometimes applied to the Barbary ape (*Onus euadatus*); also called magot. It inhabits northern Africa, and a few still exist on the Rock of Gibraltar, the only wild monkeys in Europe. These apes are gregarious, and bands often do great damage to gardens and grain-fields. See SPAIN, Vol. XXII, p. 297.

PIGOTT THE FORGER. See HOME RULE, in these Supplements.

PIGWEEED, a popular name given to the species of *Chenopodium*, a genus of notable weeds. The species are more commonly spoken of as "goose-foot."

PIKE, a long shaft or pole with metal head, carried by foot-soldiers in early and mediæval times. The pikes of the Macedonians were 24 feet in length; those of later times were from 12 to 14 feet long. The pike was used for thrusting; and as a defense against cavalry it was very effective on account of its length and rigidity. A depth of several men was necessary for its successful use, and this was decidedly disadvantageous when powder was introduced, as it gave too great an exposure of men to the enemy. The place of the pike was taken by a more effective weapon, the bayonet.

PIKE, ALBERT, an American author and soldier; born in Boston, Dec. 29, 1809; studied a short time at Harvard College, which bestowed upon him in 1859 the degree of M. A. He taught school at Newburyport and Fairhaven, Massachusetts, and started in 1831 to travel to Santa Fé by way

of St. Louis, doing the journey mostly on foot. He reached Fort Smith, Arkansas, in destitute circumstances. Here he engaged in journalism, also studying law. He edited *The Arkansas Advocate* until 1834, when it became his own property; in this year he married, and in 1836 sold out his printing-establishment and became employed in supervising the publication of the *Revised Statutes of Arkansas*. He served as a cavalry captain in the Mexican War, and was a brigadier-general in command of the Indian allies of the Confederates. In 1867 he became editor of the *Memphis Appeal*, but removed next year to Washington and practiced law until 1880. He achieved fame as a poet and writer, and was prominent in Masonic circles. In 1839 his *Hymns to the Gods* appeared in *Blackwood's Magazine*. In 1834 he published *Prose Sketches and Poems Written in the West Country* (1834); *Nugæ*, a collection of his poems (1854). *The Ode to the Mocking Bird*, originally published in 1836, was republished in *Blackwood's Magazine* in 1840; and *An Indian Romance* in 1835. He published in 1859 *The Statutes and Regulations, Institutes, Laws and Grand Constitution of the Ancient and Accepted Scottish Rite*, by Albert Pike, 33d M. P., *Sovereign Grand Commander of the Supreme Council for the Southern Jurisdiction of the United States*. He died in Washington, District of Columbia, April 2, 1891.



ALBERT PIKE.

PIKE, ZEBULON MONTGOMERY, an American soldier and explorer; born in Lamberton, New Jersey, Jan. 5, 1779. In the service of the government he explored the head-waters of the Mississippi and the interior of the Louisiana Territory; discovered Pike's Peak; reached the Rio Grande, and was for some time held prisoner by the Spanish authorities. He served in the War of 1812-14; commanded the expedition against Toronto, before which place he was killed by the explosion of a magazine, April 27, 1813.

PIKE'S PEAK, a peak in the Rocky Mountains, in El Paso County, near Colorado Springs, Colorado, 75 miles S. of Denver; lat. 38° 50' 27" N., long. 105° 2' 26" W., altitude 14,147 feet. It was discovered in 1806 by General Zebulon Montgomery Pike, who was engaged in explorations concerning the source of the Mississippi River. It commands a magnificent view of surrounding mountains within a radius of 100 miles, within which are numerous lakes, and the sources of the Platte, Arkansas, Rio Grande and Colorado (of California) rivers. From 1842 until 1888 there was located upon it a meteorological station of the United States Weather Bureau, which was re-occupied in 1892. In 1891 a mountain railway was opened connecting the Peak with Manitou Springs at its foot, a noted resort for tourists. In 1858 deposits of gold were found on its slopes, which discoveries created great ex-

citement. This was the first discovery of gold in that region, and led to an immense influx of population and to the founding of the city of Denver. See also MOUNTAIN RAILWAYS, in these Supplements.

PILASTER. See ARCHITECTURE, Vol. II, p. 469.

PILCOMAYO, a river. See PLATE, Vol. XIX, p. 188.

PILE-DRIVING. See HARBORS and DOCKS, Vol. XI, p. 465.

PILES. See HÆMORRHOIDS, Vol. XI, p. 366.

PILGRIM FATHERS, THE, the name generally given to the first settlers in Massachusetts. The story of the Pilgrim Fathers is one of the glorious chronicles of the American nation, and reverts to the period when a body of worshipers, belonging to the church of England, yet alienated from its ritual, at Scrooby, in Nottinghamshire, determined to worship without the interposition of any ritualistic forms, and with no restrictions in the study of the scriptures or the practice of its precepts according to their understanding thereof. They repudiated, moreover, the state control of the church, and civil and ecclesiastical restraints of any kind in regard to religion. This particular body was stigmatized as separatists and schismatists by the church-Puritans of the same time. The worship as professed by the Scrooby body was forbidden by law under severe penalties of imprisonment and even death; but although greatly persecuted, they made their worship a matter of conscience. Thus a great difference existed between them and the Puritans, who, while requiring a purer form of religion, desired their worship and church to be protected by law. The Scrooby independents came, in 1606, to be in great danger lest their private services should be discovered. For a while they received aid and shelter from William Brewster (q.v., in these Supplements), who with John Robinson (noted as their pastor) were the leaders of the movement which led to their leaving England and seeking an asylum in Holland. After many betrayals and persecutions, this was accomplished in the spring of 1608, Amsterdam being reached in the fall. At Amsterdam they found a company of non-church worshipers, similar to themselves, from Gainsborough, in Yorkshire. But these held views much more rigid than did Brewster and Robinson and their followers. The result was, that in 1609 the latter moved to Leyden, where their more tolerant and charitable opinions would not be a source of contention between the two parties. The Pilgrims, as they may now be called, resided eleven years in Leyden, and during that time established themselves as an industrious community. They had a large house which they used as a church, around which they erected 21 cottages for 25 families. But they found Holland, and particularly Leyden, a forbidding, hard place wherein to cultivate religious freedom. This, among other causes (chief among which might be mentioned what Robinson

called the "raging plague" of Dutch doctrinal disputatiousness), led them to look for a place where they could worship in peace.

The eyes of the Pilgrims were instinctively turned toward the broad Atlantic and to the distant and little-known land called America. Thus, in 1617, Robert Cushman and John Carver proceeded to England to negotiate with the Virginia Company to make a settlement in the company's territory. Arrangements were concluded, and in the early part of 1620 the pioneer fathers embarked in the *Speedwell* at Delfthaven, for Southampton, arriving there safely after a quick voyage. At Southampton lay the *Mayflower*—to become ever patriotically revered—ready to receive them. It was intended to send the two ships together, and they were accordingly prepared and their passengers (among whom were some others beside the Pilgrims from Leyden, as well as some adventurers) put on board. On the fifth day of August a start was made by the two vessels, but on account of some trouble with the *Speedwell* they had to put in at Dartmouth, and return to Plymouth for repairs. There it was determined to reduce the number of emigrants to one hundred besides the sailors, so as to accommodate all in one ship. Finally, on September 9th, the precious *Mayflower* put out on her fateful voyage. The following is a list of those who were passengers on the *Mayflower*: John Carver, chosen first governor, and Katherine, his wife; Desire Minter; William Brewster, ruling elder, Mary, his wife, and Love and Wrestling Brewster, his sons; Edward Winslow, sometime governor, and Elizabeth, his wife; William Bradford, second governor, and Dorothy, his wife; Isaac Allerton, Mary, his wife, Bartholomew, his son, and Remember and Mary, his daughters; Samuel Fuller, physician; Captain Myles Standish and Rose, his wife; John Alden; Christopher Martin, his wife, Joseph, his son, and Priscilla, his daughter; William White, his wife Susanna, and son Resolved; Stephen Hopkins, his wife Elizabeth, Giles and Damaris, his sons, and Constantia and Oceanus, his daughters; Richard Warren; John Billington, his wife Ellen, and John and Francis, his sons; Edward Tillie, his wife Ann, and daughter Elizabeth; John Tillie and family (3); Francis Cooke; Thomas Rogers and son Joseph; Thomas Tinker, his wife and son; John Ridgdale and wife Alice; James Chilton, his wife and daughter Mary; Edward Fuller, his wife and son Samuel; John Turner and two sons; Francis Eaton and wife Sarah; John Howland, Roger Williams, George Soule, John Crackston and his son John, Edward Doty, Edward Lister, John Goodman, Thomas Williams, Digerie Priest, Edmund Margerson, Richard Britteringe, Richard Clark, Peter Brown, Richard Gardiner, Gilbert Winslow and John Allerton. Brewster was placed in charge as assistant minister. Robinson remained behind at Leyden with the larger number of his flock, intending to follow at an early period. He had bidden his friends God-speed in a memorable ser-

mon; it was a farewell, for he was never able to follow his adventurous friends.

After a tempestuous voyage the long-suffering Pilgrims neared their journey's end. Their point of debarkation was to have been a point near the Hudson River, but they were driven north by the wind, so that the voyagers skirted along Cape Cod, and on Nov. 11th (o.s.), 1620, dropped anchor off a place afterward known as Provincetown. They then explored the coast, and subsequently landed at what was afterwards known as Plymouth Rock (q.v., in these Supplements), December 11th, (o.s.). Before landing, a remarkable compact was drawn up, stating how the colony was to be conducted, in which John Carver was named governor; the document being signed by 41 men representing the total number of Pilgrims. This memorable day (see FOREFATHERS' DAY, in these Supplements) is now celebrated annually on December 22d throughout the New England and Middle states. The colony suffered unparalleled hardships during the winter. The first cheering sight they obtained was in April, when they discovered some "modest, simple and sweet" blossoms, which they called Mayflowers—possibly suggested by their good ship, and as reminding them of the Mayflowerings of their now far-away homes. After their severe winter's experience, such as "promise of May" must have been cheerfully inspiring.

Meanwhile no report of the terrible experiences of the solitary colony cooled the ardor of Robinson and his remaining members at Leyden. They were eager to set out to join their friends. But the church-Puritan stockholders in London constantly put obstacles in the way of their accomplishing their design, and Robinson died March 1, 1625. In 1628 the leading men of the Plymouth colony bought out the London stockholders, making the colony desirably free of any restrictions emanating from abroad. Brewster was the mainstay of the colony until his death, April 10, 1644.

In the meantime, two colonies arrived in 1622 and the year following, but failed, their remnants afterward settling at Salem. Then John Endicott's colony arrived in 1628, settling at Salem, Francis Higginson's in 1629, and John Winthrop's in 1630. These were all connected, and obtained a grant on Massachusetts Bay, and also a charter, Winthrop being appointed governor. The number of new-comers in these three colonies was over twenty thousand. They were church-Puritans, and must not be confounded with the Independents or Pilgrim Fathers.

William Bradford wrote the journal of the experiences of the Pilgrims, which is one of the most interesting records of human struggle ever penned. Besides Forefathers' Day, the Pilgrims are remembered by a monument at Plymouth, and a Pilgrims' Society which built a Pilgrims' Hall. See PLYMOUTH and PLYMOUTH ROCK, in these Supplements.

PILLAR-SAINTS OR STYLITES. See MONACHISM, Vol. XVI, p. 701.

PILLARS OF HERCULES. See GIBALTAR, Vol. X, p. 585.

PILLING, JAMES CONSTANTINE, an American bibliographer; born in Washington, District of Columbia, Nov. 16, 1846; educated at Gonzaga College, Washington; until 1875 he was engaged in clerical work connected with Congressional committees, and in the year named joined the Rocky Mountain survey under Major J. W. Powell; became chief clerk of the United States geological survey in 1880, and in 1891 ethnologist to the bureau of ethnology of the Smithsonian Institution. His labors were directed in bibliographical and ethnological lines, his publications including *Catalogue of Linguistic Manuscripts in the Bureau of Ethnology* (1881); *Proof-Sheets of the Bibliography of the Languages of the North American Indians* (1885); *Bibliography of the Eskimo Language* (1887); *Bibliography of the Siouan Languages* (1887); *Bibliography of the Iroquoian Languages* (1889); *Bibliography of the Algonquian Languages* (1891); *Bibliography of the Athabaskan Languages* (1892); *Bibliography of the Chinookan Languages* (1893); *Bibliography of the Salishan Languages* (1893); *Bibliography of the Wakshan Languages* (1894). He died in Olney, Maryland, July 26, 1895.

PILLOW, GIDEON JOHNSON, an American soldier; born in Williamson County, Tennessee, June 8, 1806; graduated at the University of Nashville, 1827; became a lawyer at Columbia; and was a delegate to the National Democratic Convention in 1844, aiding materially in the nomination of James K. Polk. In 1846 he was made a brigadier-general of Tennessee volunteers, and served in the Mexican War, taking a prominent part. He commanded the right wing at Cerro Gordo, being wounded; and in 1847 was made major-general. He was present at Churubusco, Molino del Rey and Chapultepec, at the latter being severely wounded. In 1848 he was honorably discharged. He then practiced law in his own state; and as a member of the Nashville convention of 1850 was not in favor of extreme measures. In 1861 he raised a regiment of volunteers for the Confederate army, and was appointed brigadier-general, and commanded at Belmont, Nov. 7, 1861. At Fort Donelson he was second in command to General John B. Floyd, and escaped with his chief, leaving General Buckner to surrender the place to General Grant. (See FORT DONELSON, in these Supplements.) He afterwards served with General Beauregard in the Southwest. He died in Lee County, Arkansas, Oct. 6, 1878.

PILOT KNOB, a village of Iron County, southeastern Missouri, 80 miles N.W. of Charleston, on the St. Louis, Iron Mountain and Southern railroad. There is a remarkable hill here which is almost a solid mass of excellent iron-ore. The village has a large iron-smelting furnace. Population 1890, 1,757.

PILOT-SNAKE (*Coluber obsoletus*), a large non-venomous snake, of the Eastern and Southern states, principally of the Alleghany Mountains.

It is often called the mountain black-snake. It differs from the ordinary black-snake (*Bascanium constrictor*), in that the scales of *Bascanium* are smooth, while the scales of the pilot-snake are ridged.

PILOTY, CARL THEODOR VON, a German realistic painter; born in Munich, Oct. 1, 1826. He studied under his father, Theodor Piloty, a lithographer, and then entered the academy of his native town. He visited Venice in 1847, and Leipsic in 1849, and afterward Paris, London and Brussels. In 1854 he completed his great historical work, *The Elector Maximilian I Adhering to the Catholic League in 1609*; and the following year produced his *Seni before the Dead Wallenstein*. In 1856 he was appointed professor in the Munich Academy, and in 1874, director. He received a medal at Paris in 1857. His *Nero Walking among the Ruins of Rome* (1861) is intensely real, and is in the National Museum at Pesth; *The Entry of Godfrey de Bouillon into Jerusalem* is in the Maximilaneum at Munich (1862); *Galileo in Prison* is in the Cologne Museum (1864); *Columbus Discovering Land* is in the Schack gallery, Munich (1866); *Thusnelda at the Triumph of Germanicus*, purchased for 35,000 florins, is in the New Pinakothek, Munich (1873); *Wallenstein Marching against Eger* was exhibited at the Paris Exposition (1878); *The Death of Alexander the Great* is in the National Gallery at Berlin (1886). Piloty had a number of pupils, who afterward disputed with him the honors of the school he founded. His *Elizabeth and Frederick Receiving News of the Loss of the Battle of Prague* (1868) is owned in Cincinnati; his *Wise and Foolish Virgins* (1881) was exhibited in the chief cities of the United States (1887-88). He died in Munich, July 21, 1886.

PILPAY, fables. See BIDPAI, Vol. III, p. 666.

PILS, ISIDORE ALEXANDER AUGUSTIN, a French historical painter; born in Paris, July 13, 1813; was a pupil of François Picot, and graduated at the L'École des Beaux-Arts. He won the prix de Rome in 1838 with his *St. Peter Healing the Cripple at the Gate of the Temple*. His work has been called "coarse and vulgar," but he was popular, as the honors showered upon him prove. He received numerous medals; was made an officer of the Legion of Honor in 1867; elected a member of the Institute in 1868, and became professor of painting at his school. Among his works are *Death of Mary Magdalene* (1847); *Rouget de l'Isle Singing the Marseillaise for the First Time*, one of his best efforts (1849); *A Trench Before Sebastopol* (1855); *Disembarking of French Troops in the Crimea* (1858); *Defile of Zouaves in the Trench before Sebastopol* (1859); *Battle of Alma*, perhaps the work by which he will be most remembered (1861). He died Sept. 2, 1875.

PIMAS INDIANS, a linguistic stock of North American Indians, embracing numerous divisions, including the Pimas proper, Papagoes, Sobai-puris, Nevomes (Lower Pimas), Opatas, Tarahumars, Cahitas, Coras and Tepehuans. The Pimas proper call themselves A'kemori-Ohtan, meaning

a river people. Some authorities regard the Pimas, thus defined, as forming a part of a greater linguistic group, including the Shosonean, Piman and Aztec or Nahuatl tribes. They are distributed over a region extending from the Salado and Gila rivers, in southern Arizona, and over a wide area in northwestern Mexico, including most of the territory of the states of Sonora, Chihuahua, Sinaloa and Durango, and parts of Jalisco and Zacatecas. The Pimas are mostly non-nomadic, are good farmers, and have been self-supporting. The Gila reservation comprises 357,120 acres, on it being 3,723 Pimas and 202 Maricopas. The agency headquarters are located upon it, 15 miles due north of Casa Grande, Arizona. The crops are produced by irrigation, but the water-supply has become a serious problem in the reservation, on account of the decrease in quantity after January. The Salt River reservation embraces 46,720 acres near Tempe, Arizona, with 543 Pimas and 93 Maricopas. They have plenty of tillable land and water. The Gila Bend reservation, in Maricopa County, embraces 22,391 acres, with 75 Papagoes. Water is scarce on the reservation, on account of the canal and reservoir company being in the hands of a receiver. The San Xavier reservation, located about 9 miles from Tucson, Arizona, 41,600 acres of which were allotted to 517 Papagoes. A day school is conducted by the Sisters of St. Joseph. The old mission of San Xavier del Bac is located on this reservation. The farm of J. M. Berger, lying in the center of the reservation, is a model, being well kept and cultivated. The nomadic Papagoes are scattered over a vast territory. In the vicinity of Peerless Well there is a village with 246 Indians of this class. Of all these Indians the Maricopas are the most intelligent, but least inclined to work. The religious work of the agency is in good hands, but the facilities are far from adequate. A boarding-school exists at the agency headquarters.

PIMPERNEL, the popular name of species of *Anagallis*, a genus of *Primulaceæ*, or primroses. They are low herbs of the Old World, naturalized in America, with pale ovate leaves, red, blue or white wheel-shaped flowers which close at the approach of rain, and pods opening by a lid. An allied genus (*Samolus*) is known as water-pimpernel.

PINACEÆ or CONIFERS. See ARBORICULTURE, Vol. II, p. 315.

PINCHBACK, PINCKNEY BENTON STEWART, an American politician; born, of African parents, in Macon, Georgia, May 10, 1837. He enlisted in the Union army at New Orleans in 1862, and was detailed to assist in raising a regiment, but, owing to his color, he was forced to resign, Sept. 3, 1863. Subsequently he was authorized by General Nathaniel P. Banks to raise a company of colored cavalry. In 1867 he was made inspector of customs at New Orleans, was elected state senator in 1868, and in 1869 was appointed register of the land-office. He established the New Orleans *Louisianian* in 1870, and in the following

year was elected president *pro tem.* of the state senate and lieutenant-governor, to fill the vacancy caused by the death of Oscar Dunn. He was nominated for governor in 1872, but in the interest of party peace withdrew, and was elected to Congress on the same ticket. In 1873 he was chosen United States Senator, but after three years' debate his seat was disallowed. Mr. Pinckback became surveyor of customs at New Orleans in 1882, and was twice a trustee of Southern University. He was admitted to the bar in 1886.

PINCKNEY, CHARLES, an American statesman; born in Charleston, South Carolina, March 9, 1758. He was admitted to the bar in 1779, was a delegate to the Continental Congresses (1777-78 and 1784-87); a delegate to the Federal convention of 1787; governor of South Carolina (1789-92 and 1796-98); United States Senator—Democrat—(1797-1801); minister to Spain (1803-05); governor of South Carolina (1806-08); member of the state legislature (1810-14), and member of the House of Representatives (1819-21). He died in Charleston, Feb. 25, 1822.

PINCKNEY, CHARLES COTESWORTH, an American statesman; born in Charleston, South Carolina, Feb. 25, 1746, and was educated in England. He was Washington's aide-de-camp at the battles of Brandywine and Germantown, and afterward, as colonel, saw much active service until 1780, when he was taken prisoner at the surrender of Charleston and detained till the close of the war. A member of the convention that framed the Constitution of the United States (1787), he introduced the clause forbidding religious tests as a qualification for office. He declined the Secretaryship of War in 1794 and of State in 1795; in 1796 he was sent as minister to France, but the Directory refused to receive him, and he had to leave the country. It was while on this mission that, when it was intimated that peace might be granted in return for a money payment, he made the reply, "Millions for defense, but not a cent for tribute." He died Aug. 16, 1825.

PINCKNEYVILLE, a village and the capital of Perry County, south-central Illinois, 59 miles S.E. of St. Louis, on the St. Louis, Alton and Terre Haute and the Wabash, Chester and Western railroads; has two flour-mills and manufactures of plows, carriages and lumber; coal-mines are being operated near this place. Population 1890, 1,298.

PINDAR, PETER. See WOLCOTT, Vol. XXIV, p. 628.

PINEAL EYE OR PARIETAL EYE, the name now applied to the pineal gland, or epiphysis of comparative anatomy, on account of its eye-like structure in certain of the lower vertebrates. See also ANATOMY, Vol. I, pp. 876, 877; and SENSE-ORGANS, in these Supplements.

PINE AND PINE LUMBERING IN THE UNITED STATES. (For a description of various species of pine trees, see PINE, Vol. XIX, pp. 102-106.) There are upward of twenty varieties of pine in the United States, of which number only about six are of more than local importance

to the lumbering industry. First, and most important, is the white pine, (*Pinus Strobus*), which is found in the region of the Great Lakes and the St. Lawrence, extending into Maine and Canada. It reaches its greatest perfection in the upper lake region of Michigan, Wisconsin and Minnesota, where it forms extensive forests and reaches a height of 75 to 150 feet, and sometimes a girth of 10 to 12 feet. The timber produced from this tree is straight-grained, soft and light, of a whiter color, freer from pitch or resin and more easily and economically worked than any other, and is therefore more largely manufactured than the product of any other American tree. Perhaps the next in importance, of the northern trees at least, is the Norway pine (*Pinus resinosa*), otherwise known as the red or Canadian pine. This tree, also, is at its best in northern Wisconsin and Minnesota, but is found throughout Canada and to some slight extent in northern New England. It reaches the height (though seldom the girth) of the largest white pines, is heavy and resinous, and very hard, tough and elastic. For timbering, masts, spars and piling it is superior to white pine, but less desirable for fine work.

Of perhaps even wider commercial importance than the Norway pine is the yellow pine, of which, in the Southern states, there are two varieties: the *Pinus mitis*, or short-leaved pine, which ranges from southern New Jersey through the Southern states to Arkansas and Texas, and is known, commercially, as the Arkansas or Georgia pine; and the *Pinus palustris*, or long-leaved pine, which is confined to a strip along the coast from Texas to Virginia. Both woods are of dark yellow to orange color, are hard, heavy and tough, and the long-leaved variety is especially desired for timbering and ship-building. The short-leaved or Arkansas pine is finding a market in the middle Northern states, in competition with the white pine. The two other species of large commercial importance are Pacific Coast trees. The best-known is the Oregon pine (*Pseudotsuga Douglasii*), otherwise called the Douglas pine or fir, which ranges from British Columbia to the border of Mexico, and is at its best in Oregon and Washington, where it often reaches a height of three hundred feet, and exists in great forests. The wood is yellow in color, is hard, strong and durable, and is used for all kinds of construction. Quantities are sent to foreign countries for ship-building. There is also a somewhat inferior variety, known as red fir. The next in importance to the Douglas pine is *Pinus ponderosa*, a tree of the yellow-pine species, which attains a similar size and ranges throughout the same region as the last-named tree. It, also, is hard and tough, but not a durable wood. Varieties of pine, such as the sand-pine of Florida, the pitch-pine of the Rocky Mountains and the sugar-pine of California, have only a local use as lumber.

The distribution of standing pine throughout the United States has so wide a range, and the present existing supply covers so great an aggregate area, that it is next to impossible to fur-

nish an estimate of the quantity still available for use. It may be said, however, that notwithstanding the enormous annual lumber-cut—which, for all kinds of woods, both hard and soft, now averages about twenty-five thousand million feet—there is no danger of a scarcity of lumber for many years to come. There is, however, one question of economic importance in the lumbering industry which has relation especially to the Northwestern states, but may eventually prove quite wide in its influence. It is the question of the supply of white pine. This wood is now used for so many purposes to which it seems peculiarly adapted that it would seem as though the complete exhaustion of the supply must prove a loss which it will be difficult to repair. The uses to which it is now put by reason alone of its soft, light and cleanly character, are almost innumerable. The single question of packing-boxes need only be mentioned as an example. The white pine being not only light and strong, but free from pitch—all indispensable qualities—is used in preference to, and to an extent beyond, all others, and it is difficult to see how it will be possible to replace it when it no longer may be had.

In the Northwestern or Upper Lake states—chiefly confined to Michigan, Wisconsin and Minnesota—the cut of white pine in 1895 was 7,093,398,598 feet, besides which there were 2,465,368,600 shingles. This represents about the average of the past few years, and careful and conservative authorities estimate that the entire available supply of white pine will be exhausted within ten years. This must, necessarily, prove a great loss to the world, but, of course, with a vast supply of other timber to draw upon it cannot be an irreparable one.

PINE BLUFF, a city and the capital of Jefferson County, central southeastern Arkansas, 41 miles S.E. of Little Rock, on the Arkansas River, and on the Pine Bluff and Eastern, the St. Louis, Iron Mountain and Southern and the St. Louis and South-Western railroads. It has grist and planing mills, a cottonseed-oil mill, cotton-gins and the shops of the St. Louis, Arkansas and Texas railroad. Cotton is the leading staple, and extensive shipments are made of cotton and hides. It is an important manufacturing and educational center, and has an extensive trade in cotton and other products. Population 1890, 9,952.

PINE-CHAFER, a popular name applied to any coleopterous insect which attacks the foliage of pine trees. Many of them do great damage. In the United States the name is given chiefly to *Anomala pinicola*. Species of several other genera have been sometimes called pine-chafers.

PINE-FINCH (*Spinus pinus*), a small North American bird allied to the American gold-finch (*S. tristis*), and a member of the family *Fringillidae*. It is a migratory seed-eating bird. The name is also sometimes given to the pine-grosbeak (*Pinicola enucleator*). It is a much larger bird than the above and is found in both Europe and North America.

PINE-GROSBEAK. See GROSBEAK, Vol. XI, p. 209.

PINERO, ARTHUR WING, an English dramatist; born in London in 1855. Commencing a legal career, he afterward became an actor, making his *début* at Edinburgh in June, 1874, and afterward at the Lyceum and Haymarket theaters. Devoting himself to play-writing, he produced his first piece, which was entitled *Two Can Play at That Game*, at the Lyceum. This was followed by *£200 a Year* (1877); *The Money Spinner* (1880); *The Squire* (1881); *Lords and Commons*; *The Rocket* (1883); *The Magistrate* (1885); *Sweet Lavender*; *The Profligate*; *In Chancery*; *Lady Bountiful* (1891); *The Times* and *The Second Mrs. Tanqueray*, considered by many critics as his best work (1893); *The Notorious Mrs. Ebbsmith* and *The Benefit of the Doubt*, both in 1895.

PINES, ISLE OF, an island of the Archipelago de Los Cannareos, 37 miles S. of the southern coast of Cuba, lying between the 21st and 22d parallels of north latitude and the 82d and 83d of west longitude. It has a length of 60 miles, a breadth of 55 miles and an area of 1,214 square miles. The coast of the island is indented by bays, and its surface diversified by mountains, plains and rivulets. The soil is fertile, the climate mild and healthful, and the presence of mineral springs, especially those of Santa Fé, has caused the island to be frequented as a health-resort. The principal products are cattle, tobacco, pine, mahogany, cedar and other woods, sulphur, tar, turpentine, tortoise shells, magnificent marble and rock crystal. The Isle of Pines, which doubtless received its name from the heavy growth of pines upon it, was discovered by Columbus in 1494, and for many years was a notorious resort for pirates. It is now a dependency of the province of Havana, and has its capital at Nueva Gerona. Population, about 2,500.

PINES, ISLE OF. See NEW CALEDONIA, Vol. XVII, p. 376.

PINE-SNAKE, the popular name for several species of *Pityophis*, common in the pine woods of the Southeastern states. In some localities it is known as the bullsnake, because of a loud, bellying sound which it is said to produce. They are not venomous.

PINGUICULA. See INSECTIVOROUS PLANTS, Vol. XIII, pp. 137, 138.

PING-YANG. See COREA, in these Supplements.

PINKERTON, ALLAN G., an American detective; born in Glasgow, Scotland, Aug. 25, 1819. Having taken a part in the Chartist outbreak in Birmingham, England, he went to Montreal in 1840 to escape arrest, and then removed to Chicago. He became a deputy sheriff, and was appointed to the detective department of the Chicago police in 1850, from which connection originated the detective agency so closely associated with his name. To him was due the discovery of the plot to assassinate President Lincoln on his way to Washington. He organized and was the first chief of the secret police of the

Union army. His services were in request in breaking up many lawless gangs of desperadoes, including the Molly Maguires in Pennsylvania. He also recovered large sums of money from bank-robbers. He published *Spiritualists and Detectives* (1877); *Strikes, Communists, Tramps and Detectives* (1878); *Criminal Reminiscence and Detective Sketches* (1878); *The Gypsies and the Detectives* (1879); *Mississippi Outlaws and the Detectives* (1879); *Railroad Forgers and the Detectives* (1881); *Bank Robbers* (1882); *The Burglar's Fate* (1883); *The Spy of the Rebellion* (1883); *Thirty Years a Detective* (1884). He died in Chicago, July 1, 1884.

PINKERTON LAWS, or, more correctly, ANTI-PINKERTON LAWS, a class of statutes passed by the legislatures of many of the separate states after the very serious labor disturbances at Homestead, Pennsylvania (q.v., in these Supplements), in the hope of preventing similar disturbances in the future, and in response to the general and widespread sentiment of organized labor. The object of such laws is to prevent the importation of irresponsible and armed men to quell any domestic disturbances, and to prevent the swearing in or deputization of unknown and unreliable persons as peace-officers. It is claimed that the whole of the deplorable occurrences at Homestead were caused by the importation of the Pinkerton armed guards from Chicago and New York. These men were, it is alleged, commanded by leaders who had been discharged for serious offenses from the police force of the city of Chicago, and the bringing of such a body of men into the disturbed district at once precipitated trouble. There had been a long-standing and deep-seated grievance in this regard. The report on the coal combination, made in 1878 by the New York Assembly Committee on Railroads, had found "that the laboring population of the coal regions was 'kept down' by special policemen enrolled under special laws, and often in violation of law, by the railroads and coal and iron companies, practically when and in what numbers these companies choose; that these coal and iron policemen were practically without responsibility to any one but their employers, were armed as the corporations saw fit, with army revolvers or Winchester rifles, or both, were made detectives by statute, and were not required to wear shields: that they provoked the people to riot and then shot them legally." (Report, pp. 9, 94 et seq.)

As a natural outcome of the Homestead riots, many of the states placed highly penal statutes on their rolls, prohibiting, under severe and drastic penalties, the enrollment of any persons, other than citizens and residents in the county where the riots were, for the purpose of suppressing disturbances. Such statutes are in force in Colorado, Missouri, Georgia, Indiana, Illinois, Maine, Minnesota, North Carolina, Pennsylvania, Texas and Washington, and have been found to operate to the advantage of the community. There is no clause, however, restraining the United States marshal of any district from deputizing persons who are neither residents nor citizens for the purpose

of executing the orders and decrees of the United States courts. In the railroad disturbances of 1894, when so many of the workingmen were in sympathy with the propaganda of Eugene V. Debs and his American Railroad Union, it was found necessary to bring "cowboys" from the West to Chicago, in order to guard the railroad yards from incendiary attacks, and some of the most valuable service was rendered by a force of non-resident marshals commanded by West Point cadets.

PINK-EYE OR INFLUENZA. See VETERINARY SCIENCE, Vol. XXIV, p. 203.

PINKNEY, WILLIAM, an American statesman; born in Annapolis, Maryland, March 17, 1764. He studied medicine and law, and was admitted to the bar in 1786. Two years later he was a member of the state convention that ratified the United States constitution, and was elected the same year to the state legislature. He was sent as a United States commissioner to Great Britain under the Jay treaty (1796-1804). In 1805 he became attorney-general of Maryland; in 1806 he was minister extraordinary to Great Britain, and from 1811 to 1818 was minister resident. From 1811 to 1818 he was attorney-general of the United States. He served in the war with Great Britain in 1812; was severely wounded at Bladensburg in 1814. In 1815 he was elected to Congress, and next year was appointed minister to Russia; was special envoy to Naples until 1818 and United States Senator from 1820 to 1822. He died Feb. 25, 1822.

PINKROOT, the popular name of *Spigelia Marilandica*, a plant of the family *Loganiaceae*. It grows in rich woods of the Alleghany region and westward, with sessile lanceolate leaves, terminal spike-like clusters of handsome flowers (red outside, yellow within) and short pods. The root is used as a vermifuge,—a fact which gives rise to the common name worm-grass.

PIN-MONEY. See HUSBAND, Vol. XII, p. 401.

PINNIDÆ, a family of bivalve mollusks, found chiefly in warm seas. The triangular shells are sometimes twenty inches long. The byssus consists of long slender silken fibers, which were woven into a beautiful cloth by the ancients, and even now in some parts of Italy. The family has about fifty species, all of which are popularly known as the pinna or the sea-wings.

PINNIPEDIA. See MAMMALIA, Vol. XV, p. 442.

PINTO. See PARASITISM, Vol. XVIII, p. 270.

PINTO, ALEXANDRE ALBERTO DA ROCHA SERPA, a Portuguese soldier; born April 20, 1846, at the Tendaes, in the province of Douro, and educated at the Royal Military College, Lisbon. In 1869 he was in the Zambesi war, and in the battle of November 23d, at Massangano, he succeeded in saving the regiment. He was then in command of the African native troop. During 1877-79 he crossed Africa from Benguella to Durban, and he has admirably described the journey in a work entitled *How I Crossed Africa* (1881).

These geographical tasks obtained for him the gold medals of the geographical societies of London, Paris, Antwerp, Rome and Marseilles. He was also elected a fellow of the most important geographical societies in the world and of many scientific associations. Major Serpa Pinto was made aide-de-camp to the King of Portugal in 1880. He was a knight commander of the Order of St. James of Portugal, a knight of the Legion of Honor and of Leopold of Belgium, and received many other orders.

PIN-WORM. See **VETERINARY SCIENCE**, Vol. XXIV, p. 205.

PIOMBO, a Venetian painter. See **SEBASTIANO**, Vol. XXI, p. 615.

PIPE-CLAY or **TERRA ALBA**, a very fine clay which is free from iron and other impurities. It has a grayish-white color, is greasy to the touch, has an earthy fracture, adheres easily to the tongue, and is plastic, tenacious and infusible. It is used in the manufacture of tobacco-pipes and white pottery. It is also a special article with soldiers, being excellently adapted for cleaning their white trousers, and particularly their belts.

PIPE-LINES. The first pipe-line of any importance laid in the United States for the transportation of petroleum was a four-inch pipe of 55 miles' length, leading from the oil-wells to Pittsburgh. The total mileage of trunk lines in the United States in 1895 was 2,688 miles, divided as follows: Pittsburgh line, 55 miles; Buffalo line, 4-inch pipe, 56 miles; Cleveland line, 5-inch, 111 miles; Philadelphia line, 6-inch, 235 miles; Baltimore line, 5-inch, 66 miles; New York line, 6-inch, 762 miles; tide-water line to Bayonne, New Jersey, 6-inch, 284 miles; Southern line, 6 and 8-inch, 364 miles; Crescent or Mellon line to Linwood, 5-inch, 267 miles; United States line to Wilkesbarre, 4 and 5 inch, 244 miles of double pipe, or 488 miles. The pipe-lines are used, as a rule, for transporting crude petroleum, but the United States line is built double because one pipe is used to transport the refined product kerosene.

In Russia there are 22 pipe-lines, some of them having 8-inch pipes. There are other short lines in Canada, Italy, Baku, Burma, Java and Sumatra.

In addition to these, there are a vast number of small diameter lines for private use, as for delivery from tank-steamers to storage-tanks in the large cities, and from individual wells to the trunk lines. No accurate census has ever been taken of these, but a representative of the Standard Oil Company estimates that there are at least twenty-five thousand miles of such two-inch lines in the Pennsylvania oil-field.

Trunk-line pipes are commonly made in 18-foot lengths, and connected by long sleeve-couplings with tapered threads. As a rule, the pipes are laid only two or three feet below the surface, and at short intervals bends are introduced to allow for expansion or contraction of the pipe with changes in temperature. The pipes are kept clean by passing through them a scraper familiarly known as a "go-devil." It consists of a

set of radial steel blades, arranged to rotate around a center in such a manner that it tends to work itself forward. It is jointed so as to pass the bends, and is steadied by arms extending both forward and backward to keep it in proper position. At the end of the pipes, catch-boxes are placed to receive the go-devils on the completion of their trips.

In pumping the oil through the lines, a special form of pump is used which delivers the oil in a steady, continuous stream, without any hammering of the pipes. On the New York line are eleven pumping-stations, each having a boiler-house, pump-house containing two pumps, telegraph-office and two or more tanks. The pumps are capable of forwarding a barrel of oil at each stroke, every seven seconds, and are operated 24 hours a day.

The pipe-lines of the United States now carry nearly fifty million barrels of petroleum annually, and about ten millions more barrels are allowed to go to waste because of a lack of demand at ruling prices.

C. H. COCHRANE.

PIPE-MAKING. The larger sizes of gas-pipe and water-pipe are made usually of cast-iron with special machinery, the flasks or molding-boxes being also of iron. If a five-inch pipe is to be cast, a wooden pattern nearly six inches in diameter is set upright in the flask. The molding-sand having been jammed tight around this pattern, it is withdrawn, leaving a straight smooth hole the size of the outer diameter of the pipe that is to be made. Next a core five inches in diameter is slipped into the exact center of the hole in the mold, so as to leave a space all around to be filled with the molten iron. This core consists of a bar of iron which has been well wrapped about with rope, on which clay is pressed tightly and rounded up in a rough form of lathe, so that it is the exact size and shape of the interior of the desired pipe. The core thus formed is then baked hard, after which it is ready for use. A series of flasks, when ready, are taken by means of an overhead crane to the casting-pit. A huge ladle, capable of holding anywhere from half a ton to five tons of molten iron, is suspended on a track over the pit. When the iron in the cupola is at the proper heat, the ladle is run to the mouth, out of which flows the fiery hot metal. The ladle is then quickly swung over the various flasks, each of which is poured full. When cool, the flasks are taken out of the pit, and the pipes removed and cleaned, ready for market. Odd-shaped pieces, as crosses, Y's, T's and bends are cast in the same manner as any small hollow-work in an iron foundry.

Where large iron pipe of one to three feet diameter is to be made quite thin, the latest process of manufacture is to form it from sheet-metal by electric welding. Before electric welding came in, it was impracticable to make a wrought-iron or steel pipe of two-foot diameter, or less than three eighths of an inch thickness, because so much of it had to be heated at once that it would not main-

tain its shape. The electric welder requires the heating of only a small portion at a time, hence it is entirely practicable to make a two-foot pipe of only one quarter of an inch thickness, or even less.

The most recent machinery for making lead pipe consists principally of a powerful hydraulic press, into the heated cylinder of which molten lead is poured from a furnace. Proper dies being fastened in the ram above, the cylinder is forced upward, pressing the lead up through the holes in the dies. The lead is chilled and solidified as it passes upward into the form of completed pipe, which is then coiled on a drum in lengths of about ten feet, and is ready for market.

C. H. COCHRANE.

PIPERACEÆ. See PEPPER, Vol. XVIII, p. 516.

PIPESTONE, a village and the capital of Pipestone County, southwestern Minnesota, 88 miles S. of Ortonville, on the Burlington, Cedar Rapids and Northern, the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul, Minneapolis and Omaha and the Great Northern railroads; has the pipestone-quarry and some manufacturing. Population 1890, 1,232; 1895, 1,668.

PIPE-TOOLS. The most important machine of the pipe-fitter is the cutting and threading machine, commonly called a pipe-machine. They are fitted with sets of die-stocks, and are made for both hand and power. Hand-cutters are made somewhat in the form of a wrench, but with rotating cutter-wheels in place of gripping faces. Chain pipe-tongs have come into considerable use, having a metal chain, which is cramped about the pipe, there being one toothed face on the tool to prevent slipping. The forms of pipe-vise are too numerous to catalogue here. The most common of them have two V-toothed faces, which are screwed together, thus pressing the pipe at four points. Pipe-tapping machines are made with a chain grip to hold them solid to the pipe. The drilling and tapping are then done with a ratchet-handle set in the framework of the machine. A recent successful form of pipe-jointer has a metal band which is packed and passed around the joint which it is desired to make tight. A thumbscrew arrangement is then tightened up, drawing the band and packing snugly into place. A pipe-bender is commonly made of a coiled spring, inserted within the pipe, which may then be bent in any convenient manner without being deformed by doubling at the bend. Pipe-dies are made like any other thread-cutting dies, except that they are almost invariably made for cutting taper threads. Pipe-wrenches are commonly made like monkey-wrenches, except that one jaw is toothed and curved. Other minor tools are manufactured in great variety for the use of the pipe-fitter.

PIQUA, a city of Miami County, western Ohio, 27 miles N. of Dayton, in a rich agricultural district, on the Miami River, on the Miami and Erie canal, and on the Pittsburg, Cincinnati and St. Louis and the Cincinnati and Michigan railways. It has abundant water-power, and

manufactures of corrugated iron, flour, oatmeal, carriages, furniture, stoves and ranges; has the Schmidlapp Free School, a public library, three national banks and three daily papers. Population 1890, 9,090.

PIRACICABA, a city of São Paulo, in Brazil, on a river of the same name, which is a branch of the Tieté. The city is connected with São Paulo by rail, the distance being 97 miles. It is a rich sugar and coffee center. Population, 5,000.

PIRÆUS. See ATHENS, Vol. III, p. 4.

PISA, COUNCIL OF. See POPEDOM, Vol. XIX, p. 502.

PISAGUA, a town in the province of Tarapacá, Chile, 44 miles N. of Iquique, a large port of shipment for great quantities of nitrate of soda. The town was destroyed on Aug. 13, 1868, by a great wave following an earthquake, was rebuilt only to be destroyed a second time during the Chilean-Peruvian war; has since been totally rebuilt. Population, about 5,000.

PISAN, CHRISTINE DE. See FRANCE, Vol. IX, p. 647.

PISANO. See GIUNTA, Vol. XI, p. 664.

PISCATAQUA, a river about eighty miles in length, formed by the junction of the Salmon Falls and Coheco rivers, and forms the southern part of the boundary between Maine and New Hampshire; empties itself into the Atlantic, forming at its mouth the excellent harbor of Portsmouth.

PISCATAQUIS, a river which rises in Somerset County, northwestern Maine, and flowing east through Piscataquis County, reaches the Penobscot River at a point called Howland. Length of the river, nearly seventy-five miles.

PISCIDIA, a West Indian genus of leguminous trees, whose single species (*P. Erythrina*) yields a valuable and beautiful wood. The powdered leaves and twigs are used to stupefy fish. The species occurs to some extent, also, in Florida and Mexico.

PISTIL. See BOTANY, Vol. IV, pp. 141, 142.

PITCH. See MUSIC, Vol. XVII, pp. 202, 203.

PITCHER PLANTS. See INSECTIVOROUS PLANTS, Vol. XIII, pp. 138, 139.

PITCHSTONE. See GEOLOGY, Vol. X, p. 231.

PITH. See BOTANY, Vol. IV, p. 100.

PITHECANTHROPUS ERECTUS, the name given to the once-existing animal represented by certain fossil remains recently discovered in Java by Dr. Dubois, and regarded as the "missing link" between man and ape. The discovery of the remains, made in 1891 and 1892, created a widespread interest, and was discussed in the meetings of scientific bodies all over the world. The remains were described by the discoverer in a publication with the following title: *Pithecanthropus Erectus, Eine Menschenähnliche Uebergangsform aus Java. Von Eug. Dubois, Militärarzt der Niederländisch-Indischen Armee. Mit Zwei Tafeln und Drei in den Text Gedruckten Figuren. 4to Batavia: 1894.*

A summary of the description was published by Prof. O. C. Marsh in the *American Journal of Science*, February, 1895. As it is seldom that a

"new man" is discovered, we quote Professor Marsh's article somewhat extensively, the discovery being the most important that has been made in the department of anthropology since the "man of Spy" came, in 1886, to the rescue of the Neanderthal discovered in 1857.

The three specimens were found near Trinil, in the precinct of Ngwai, of the Madiun province, central Java, at different times, in the same horizon, and all imbedded in the same volcanic tufa. The tooth was found in September, 1891, the skull a month later, only a meter distant from the tooth; and in August, 1892, the femur was found, 15 meters from the positions of the former. The characters of these fossils were regarded by their discoverer as entitling them to represent a new species and genus, and also a new family (*Pithecanthropidae*), distinguished by the following characters:

The brain cavity is larger, and in proportion to the size of the body much more capacious, than in *Simiidae*, yet less so than in *Hominidae*. The capacity of the skull is about two thirds less than that of the average of man. The inclination of the nuchal surface of the occiput is considerably greater than in *Simiidae*. The dentition, although somewhat specialized, is still of the Simian type. The femur is equal in its dimensions to that of man, and, like that, adapted for walking in an upright position.

Only the upper portion of the skull is preserved—the line of fracture extending from the glabella backward irregularly to the occiput, which it divides somewhat below the upper nuchal line. The cranium, as seen from above, is an elongated oval in outline, dolicephalic. It is distinguished from that of other anthropoid apes by its large size and its higher arching in the coronal region. The greatest length from the glabella to the posterior projection of the occiput is 185 millimeters; the greatest breadth is 130 millimeters, and smallest (behind the orbit) 90 millimeters. The cranium, in its original condition, must have been of slightly greater dimensions. The upper surface is smooth, and the sutures all appear to be obliterated.

This dolicephalic skull, with an index of 70°, is readily distinguished from that of orang-utan, which is decidedly brachycephalic. The absence of the characteristic cranial crests will separate it from the skull of the adult gorilla. In its smooth upper surface and general form, it shows a resemblance to the skull of the chimpanzee, and still closer to that of the gibbons.

The tooth is the last upper molar of the right side, and is in good preservation. It indicates a fully adult, but not a very old, animal. The crown is subtriangular in form with rounded corners, the narrowest portion being behind. The antero-posterior diameter of the crown is 11.3 millimeters, and the transverse diameter 15.3 millimeters. The grinding-surface of the crown is concave, and much less rugose than in existing anthropoid apes.

The femur, which is from the left side, is in fair

preservation. In form and dimensions it resembles so strongly a human femur that only a careful comparison would distinguish the one from the other. The bone is very long, its greatest length being 455 millimeters. The shaft is slender and nearly straight.

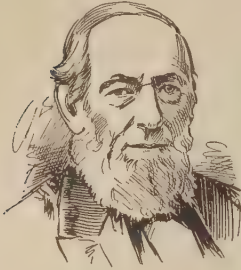
Professor Marsh, in concluding his remarks says: "Dr. Dubois has proved the existence of a new prehistoric anthropoid form, not human indeed, but in size, brain-power and erect posture much nearer man than any animal hitherto discovered, living or extinct."

The significance of these remains will appeal more forcibly to the popular mind when it is pointed out that during the epoch when *Pithecanthropus* was wandering about in his native habitat, and in his supposedly erect manner, Java was continuous with Asia and Europe, the whole then existing as a continent, sweeping round to Tunis, in Africa, and divided by the Saharan Sea from southern Africa. Arabia and Hindustan were islands; but there were land bridges between the continent we have described, to which modern scientists have given the name Eurasia, and South Africa. Further, there was a land connection, by England, Iceland and Greenland, with America. We have thus a valuable aid to our understanding of the possibility of the "new man" having been in the line of evolution or descent with later man himself. If these conclusions are correct the antiquity of man must be extended back into the Tertiary, and his affinities with the higher apes become much closer than hitherto supposed.

PITMAN, BENN, an American phonographer and educationist, brother of Sir Isaac, born in Trowbridge, England, June 24, 1822. He studied architecture, and also gave lectures explaining his brother's system of phonography in England in 1843-53. He then went to the United States and settled at Cincinnati, and compiled and printed books on phonography. He was official reporter of many important state trials in 1862-65. In 1873 he became an instructor in the school of design of the University of Cincinnati.

PITMAN, EMMA (RAYMOND), an English authoress; born in Milborne Port, Somersetshire, in 1841; while young, gained several prizes for essays, and was a contributor to *Sunday at Home* and other periodicals. When 17 years of age she finished her first work, *The Power of Little Things*. Her works began to appear regularly from 1869, in which year appeared *Vestina's Martyrdom*, followed by *Earnest Christianity* (1872); *Margaret Mervyn's Cross* (1878); *Profit and Loss* (1879); *Heroines of the Mission Field* (1880); *Mission Life in Greece and Palestine* (1881); *Florence Godfrey's Faith; Life's Daily Ministry; My Governess Life* (1882); *Central Africa, Japan and Fiji* (1883); *Elizabeth Fry* (1884); *George Muller and Andrew Reed* (1885); *One of the Least and Ray Elliott's Deliverer* (1887); *Lady Missionaries in Foreign Lands* (1889); *Lady Hymn Writers* (1891); *Oliver Chauncey's Trust* (1892). In 1866 she married Edwin Pitman.

PITMAN, SIR ISAAC, a British educator, inventor of the Pitman system of shorthand writing; born in Trowbridge, Wiltshire, Jan. 4, 1813. He was educated at the Normal College of the British and Foreign School Society, becoming afterward (1832) master of the British school at Barton-on-Humber; and in 1836 established a similar school at Wotton-under-Edge. He removed to Bath in 1839, where he



SIR ISAAC PITMAN.

subsequently established the Phonetic Society (1843) and set up a press for printing his own handbooks of phonetic shorthand and a series of classical works, including the Bible and *Rasselas*, in phonetic type. He founded the *Phonetic Journal*, which is devoted to the advocacy of writing and spelling reform. In 1837 appeared his first work on shorthand, which he entitled *Stenographic Soundhand*, in which he advocated the reformation of orthography. He renamed his system in 1840, when his work, *Phonography; or, Writing by Sound*, was published. A more complete work, *The Phonographic Reporter's Companion*, appeared in 1846. A gold medal from the phonographers of the United States, as well as one from those of Great Britain and the colonies, was presented to him for his services. Mr. Pitman was knighted in 1894. He died Jan. 22, 1897.

PITRA, JEAN BAPTISTE, a Roman Catholic ecclesiastic, born in Champforgeuil, near Autun, Aug. 31, 1812; entered the order of St. Benedict and devoted himself to historical studies in the abbey of Solesme. In 1858 he was sent by the pope to Russia to study the Slavonic liturgy, was created a cardinal priest in March, 1863, librarian of the Vatican in 1869, and cardinal bishop of Frascati in 1879. His works include *Spicilegium Solesmense* (1852-60); and *Juris Ecclesiastici Græcorum Historia et Monumenta* (1864-68). He died Feb. 3, 1889.

PITRÉ, GIUSEPPE, an Italian folk-loreist; born in Palermo, Dec. 23, 1841. On the outbreak of the revolution in 1860 he volunteered into the army of Garibaldi. At the close of the war he studied medicine at Palermo, graduating in 1866. About 1868 he began the great work of his life, when he left the study of literature proper for that of popular literature and folk-lore generally. With incessant and enthusiastic labor he devoted himself to his chosen study, and enriched science and honored his native land with a long series of books and papers of the highest value, covering the whole field of Italian folk-lore. His *Biblioteca Tradizioni Popolari Siciliane* includes 19 volumes (1870-91); while another series, *Curiosità Popolari Siciliane*, includes 10 volumes (1885-91). A large amount of his most valuable work is to be found in the pages of the quarterly journal founded and edited by him in 1882, *Archivio per lo Studio delle Tradizioni Popolari*. He also

published *Bibliografia delle Tradizioni Popolari d'Italia* (1891).

PITTIDÆ. See PITTA, Vol. XIX, p. 149.

PITTOSPORUM FAMILY, a small family of shrubs and trees, belonging mostly to Australia. The common *Pittosporum* (*P. Tobira*) of cultivation is a low tree from Japan, with obovate evergreen leaves crowded at the ends of the branches, which are terminated by a small sessile cluster of fragrant white flowers.

PITT PRESS, Cambridge, England, an educational publishing enterprise under the auspices of the University of Cambridge, and a department of the Cambridge University Press. It is housed in an ecclesiastical-looking building, and perpetuates the memory of William Pitt, the Premier. Its publications are chiefly text-books for schools and colleges, annotated by well-known scholars, including the classics, English and modern languages, literature, and other subjects read for the Cambridge local examinations and for use in secondary schools and first-year work in colleges.

PITTSBURG, a city of Crawford County, southeastern Kansas, 55 miles E. of Independence, on the Atchison, Topeka and Santa Fé, the Kansas City, Pittsburg and Gulf, the Missouri Pacific and the St. Louis and San Francisco railroads. It is in a coal-mining district and contains zinc-works and coal-mines with very large deposits. There are large brick-works and other manufactures. Population 1890, 6,697; 1895, 8,982.

PITTSBURG, a city of Pennsylvania. The table on the following page will show some of the principal mechanical and manufacturing industries of Pittsburg as given by the United States census of 1890. The numerous lofty hills, which in its early days closely environed the town, have, with the growth of the city and consequent enlargement of its borders, been cut down, or much reduced, and now the highest eminence is Herron Hill, having an elevation of 535 feet above the plateau portion of the city. In 1894 there were 405 miles of streets, mostly paved and sewered, lighted with gas and electricity, and traversed by cable and electric street railways, which connected the city with Allegheny and other suburbs.

Among some of Pittsburg's new buildings are the City Hall, on Smithfield Street, built entirely of solid white sandstone, at a cost of \$700,000; the United States Post-Office and Court-house, built in 1884; Trinity and St. Peter's, First and Third Presbyterian and German Lutheran churches. The city has six colleges and seminaries; the Western Pennsylvania University, which was completed in 1890, has a library of 10,000 volumes. The school census of 1890 shows that 27,564 pupils enrolled, and 605 teachers. The Mercantile Library Association, with a membership of 750, reports, in 1891, 23,386 volumes on its shelves. Among the benevolent institutions are such hospitals as the Mercy; the West Pennsylvania, with a department for insane at

MECHANICAL AND MANUFACTURING INDUSTRIES.	NUMBER OF ESTABLISHMENTS REPORTING.	AGGREGATE CAPITAL INVESTED.	AVERAGE NUMBER OF EMPLOYEES.	AVERAGE TOTAL WAGES.	TOTAL VALUE OF PRODUCTS.
Brick and tile	32	\$1,187,777	995	\$498,616	\$1,066,824
Clay and pottery	3	339,727	193	109,743	218,771
Foundry and machine-shop products, including iron-work, architectural and ornamental, steam-fitting and heating apparatus	85	10,667,768	5,979	3,610,964	11,683,809
Glass	34	7,439,619	6,798	3,504,340	6,176,076
Glass cutting, staining and ornamenting	5	57,626	79	56,354	128,447
Iron and steel	33	48,266,434	20,656	13,170,887	49,718,729
Iron and steel bolts, nuts, washers and rivets	4	332,344	127	76,734	427,911
Iron and steel nails and spikes, cut and wrought, including wire nail	4	1,601,499	783	466,257	2,560,094
Iron and steel pipe, wrought	3	3,767,038	1,979	1,073,805	5,992,395
Liquors, malt	13	2,927,720	442	345,572	2,290,923
Tobacco, cigars and cigarettes	74	386,302	843	325,384	1,043,393

Dixmont; the City General; the Homœopathic Dispensary; the Pittsburg Dispensary; the Pittsburg Infirmary; several homes under various church auspices; and the Roman Catholic Orphan Asylum. There are 276 churches, including nearly every denomination. A very handsome railroad bridge was constructed in 1890 over the Ohio River, connecting Bremot's Island with the city. Population 1890, 238,617. See also PITTSBURG, Vol. XIX, p. 150.

PITTSBURG, a village and the capital of Camp County, northeastern Texas, 110 miles E. of Dallas, on the Sherman, Shreveport and Southern and the St. Louis South-Western railroads. It has planing and grist mills; has coal in vicinity, and produces sugar-cane, cotton and lumber. Population 1890, 1,203.

PITTSBURG LANDING, BATTLE OF, called by the Confederates "the battle of Shiloh." This was the most important engagement of the western armies during the Civil War. The Federal forces were under the command of Gen. U. S. Grant and the Confederates under the command of General Albert Sidney Johnston. The date was April 6 and 7, 1862. The field embraced a district about three miles in width, extending from Pittsburg Landing, on the Tennessee River, to a log meeting-house called Shiloh. Pittsburg Landing is ten miles from the northern boundary of Mississippi and 17 miles northwest of Corinth, Mississippi. Shiloh Church stood on the Corinth road, on a ridge of land extending from the Snake River to Lick Creek. Snake River empties into the Tennessee below Pittsburg Landing, and Lick Creek about a mile and a half above. Both streams were bordered with swamps. The whole country is undulating and scatteringly wooded. Grant had determined to attack the Confederates, who were concentrated at Corinth. He had under his immediate command the divisions of Sherman, Prentiss, McClernand, Hurlburt, W. H. L. Wallace and Stuart. The troops of these divisions he had marched from Savannah, nine miles to the north. They were drawn up with Sherman on the right near Snake River, McClernand in the center and Prentiss on the left, with Stuart, Hurlburt and Wallace close upon the rear as reserves. At

Pittsburg Landing lay two gunboats to cover the crossing. Five miles down the river was General Lew Wallace with a division. Nearing Savannah was General Buell with the divisions under McCook, Nelson and Crittenden. The troops under Buell and Lew Wallace were veterans. Those under Grant were, for the most part, raw recruits. The total number of effective Union men who participated in the battle was about fifty-eight thousand.

Johnston had about forty thousand men, under Generals Hardee, Bragg, Polk, Beauregard and Breckinridge. Anticipating Grant's motive, Johnston, knowing the raw condition of the greater portion of the Federal troops, and fearing a junction between Grant and Buell, decided to attack Grant near Pittsburg Landing. He advanced from Corinth on the 3d and 4th, and on the afternoon of the 5th was two miles from Shiloh. He ordered a general attack by Hardee, Bragg and Polk on the morning of the 6th. The Federal forces, though taken somewhat by surprise, almost immediately recovered, and made a most obstinate resistance. They were gradually forced back, until at half-past ten they were a mile from their original position. Here a stand was made and the position held until four p.m., when a terrible charge of the Confederate reserves under Breckinridge drove the Federal troops on the left back almost to the river. A battery and gunboat fire alone put a stop to the Confederate advance. But just before this charge, while directing the troops, General Johnston was mortally wounded. The command devolved upon Beauregard. With the charge and retreat the first day's fighting was ended. The Federal right had been driven back, but the center, under Prentiss, had held its position, and by the retirement of the two wings was left exposed, surrounded, and Prentiss, with 2,200 of his men, was taken prisoner. Gen. W. H. L. Wallace was killed, and the Confederate staff suffered severe losses. Buell had reached the bank opposite Pittsburg Landing, and during the night his troops were crossed and placed in position on the Federal left. General Lew Wallace, who had been ordered to advance from Crump's Landing, had misunderstood the orders

and made such a circuitous march that he did not reach the battlefield until night. He was placed on the extreme right. Thus reinforced, Grant decided to assume the offensive and ordered an attack at daybreak of the 7th. The Confederates made a stubborn resistance, but were forced back, and by a bayonet charge led by Grant himself, driven in full retreat toward Corinth. Pursuit was next to impossible, owing to the muddy roads. This Union victory led to the continued retreat of the Confederates from Corinth, and ultimately to the surrender of Vicksburg. The Federal losses were 2,885 missing, 8,408 wounded and 1,754 killed. The Confederates lost 957 missing, 8,012 wounded and 1,728 killed.

PITTSFIELD, a village and the capital of Pike County, western Illinois, 62 miles W. of Springfield and 40 miles S.E. of Quincy, on the Wabash railroad; the trade center of an agricultural district, and has a woolen factory, a graded school, a national bank and nine churches. Population 1890, 2,295.

PITTSFIELD, a village of Somerset County, south-central Maine, 37 miles N.N.E. of Augusta and 25 miles W. of Bangor, on the Maine Central and the Sebasticook and Moosehead railroads. It has a woolen-mill, iron foundry and the Central Maine Institute. Population 1890, 1,597.

PITTSFIELD, a city and the capital of Berkshire County, Massachusetts. The principal industries are the manufacture of shirts, bricks, paper, paper machinery, electric machinery, shuttles and bobbins and brass castings, and it has a brewery. Pittsfield has the hospital of the House of Mercy, Old Woman's Home, Training School for Nurses, three national banks and two savings banks. There are 24 public-school buildings and 11 churches. Population 1895, 20,461. See also **PITTSFIELD**, Vol. XIX, p. 151.

PITTSFIELD, a village of Merrimack County, central southeastern New Hampshire, 25 miles N.E. of Concord, on the Boston and Maine railroad. It has an academy and manufactures of cotton goods, boots and shoes. Population 1890, 2,605.

PITTSTON, a borough of Pennsylvania, on the Delaware, Lackawanna and Western and the Lehigh Valley railroads. Population 1890, 10,302. See also **PITTSTON**, Vol. XIX, p. 151.

PIURA, a town of Peru, 210 miles S. by W. of Guayaquil, Ecuador; the capital of the department of Piura. The department contains a rich petroleum deposit, about 4,000 square miles in extent, mostly lying close to the coast, near the Bay of Tumbes. Population of town, 8,000.

PIUTES or **PAH-UTES**, a tribe of the Shoshonean linguistic stock of North American Indians, the name properly belonging to the Corn Creek tribe of southwestern Utah. In a wider acceptance, the name includes numerous Shoshonean tribes—8 in southwestern Utah, 17 in southeastern Nevada, 4 in northern and western Arizona (those including the Chemehuevi, the southernmost members of the tribe) and 19 in southeastern California, extending from Owens Valley, along the Sierras, to the south of Tulare Lake and east of the Coast Range. The tribe numbers altogether about six thousand. They are industrious and always looking for employment.

They readily perform manual labors and are expert vaqueros.

PIZARRO, GONZALO. See **PERU**, Vol. XVIII, p. 677.

PLACENTA. See **MAMMALIA**, Vol. XV, pp. 368, 369. Vegetable; see **BOTANY**, Vol. IV, pp. 142, 143.

PLACER-MINING. See **GOLD AND GOLD-MINING**, in these Supplements.

PLACERVILLE, a town and the capital of Eldorado County, northeastern central California, about 50 miles N.E. of Sacramento, on the south fork of the American River, and on the Southern Pacific railroad. It is in a mountainous region, and is engaged principally in gold-mining, but has also sash and door factories, foundry, machine-shop and quarries of slate and limestone. Population 1890, 1,690.

PLAINFIELD, a village of Windham County, eastern Connecticut, 27 miles W. of Providence and 23 miles N.N.E. of New London, on the New England railroad; in an agricultural district, and has factories of cotton and woolen goods, bricks and carriages. Population 1890, 4,582.

PLAINFIELD, a city of New Jersey; contains 14 churches, five public-school buildings, a seminary for young women, an academy for boys, a public library and an art gallery, seminary, public school and Y.M.C.A. libraries, Muhlenberg Hospital, two national and a savings bank; has manufactures of printing-presses, oil-cloth, machine-tools and carpets. Population 1890, 11,267. See also **PLAINFIELD**, Vol. XIX, p. 168.

PLAINS, a village of Luzerne County, eastern Pennsylvania, about five miles N.E. of Wilkesbarre, on the Susquehanna River, and on the Central Railroad of New Jersey and the Lehigh Valley railroad. It is in a mining district, and its chief industry is the mining of coal. Population 1890, 1,029.

PLAINS, THE GREAT. See **UNITED STATES**, Vol. XXIII, pp. 792, 793.

PLAINWELL, a village of Allegan County, southwestern Michigan, on the Kalamazoo River, and on the Lake Shore and Michigan Southern and the Grand Rapids and Indiana railroads, 10 miles N. of Kalamazoo. It is situated in an agricultural and fruit-raising district, and contains a number of flour, lumber and paper manufactories. Population 1890, 1,414; 1895, 1,447.

PLANER TREE, the common name of *Planera aquatica*, a small tree of the river swamps from Kentucky southward, with ovate-oblong leaves, axillary cluster of small flowers and a nut-like fruit beset with irregular warts or crests. It belongs to the family *Urticaceae*, and is very closely related to the elms.

PLANE TREE. See **ARBORICULTURE**, Vol. II, p. 317.

PLANE-TABLE. See **SURVEYING**, Vol. XXII, p. 718.

PLANETS. See **ASTRONOMY**, Vol. II, pp. 776-783; and in these Supplements.

PLANIGRAPH, a draftsman's instrument for copying a drawing on a different scale. It is a rod having a variety of scales marked on the opposite ends. Being pivoted in the center, and one end

being allowed to rest on the drawing, measurements may be read from a scale on that end and marked off on a paper under the other end by a different scale, which will enlarge or reduce the proportions as desired.

PLANKTON, a term, meaning wandering, originally applied by Hensen to all organisms, collectively, which float involuntarily near the surface of the ocean and other waters. Haeckel, in his *Plankton Studien* (1890), included under the term all organisms swimming either actively or floating passively in the water, while those living on the bottom or shore were called collectively *benthos*. Recently the term has become limited in application, and in general use it is a collective term for the small organisms of the *plankton* in above sense, especially those which are eaten by fishes. The United States Fish Commission has undertaken extensive studies of the nature, i.e., the kinds of organisms composing the *plankton*, its amount and distribution and especially its value as food of fishes. By studying collections from various localities and depths, and by determining the organisms eaten by various fishes, it has been definitely shown that there is a close co-relation between the nature, the amount and distribution of the *plankton*, and the forms, numbers and distribution of fishes. Thus the *plankton* studies have come to have a great economic importance.

PLAN OF CAMPAIGN, THE. See **HOME RULE**, in these Supplements.

PLANOGAMETE, the name applied to those gametes (sexual cells) of isogamous plants (that is, those in which the gametes are alike) which are not free-swimming. Examples are found among the conjugate algæ.

PLANQUETTE, ROBERT, a French composer; born in Paris, July 31, 1850; educated at the Conservatoire. Having achieved success in his songs and chansonsettes for the cafés-concerts, he attempted operettas, producing *Valet de Cour*; *Le Serment de Mme. Grégoire*; and *Paille d'Avoine*. Then he produced *Les Cloches de Corneville*, an operetta in three acts, which was produced at the Folies Dramatiques, April 19, 1878, and had an immediate success. It was reproduced in an English adaptation, in London, the following year. Among his other works are *Le Chevalier Gaston* (1879); *Les Voltigeurs de la 32me* (1880); *Rip Van Winkle* (1882); *Paul Jones* (1889); and *Le Talisman* (1893). He was also the author of a volume of military songs, *Refrains du Régiment*.

PLANT-CUTTER, a name given to birds of the family *Phytotomidae*, which is composed of the single genus *Phytotoma*. They are small sparrow-like birds, having serrated bills, with which they cut off young sprouts and buds of plants. In western South America they often greatly injure plantations. Their peculiar, harsh, rasping cry is very disagreeable.

PLANTÉ'S CELL. See **ELECTRICITY**, § 109, in these Supplements.

PLANT-LOUSE. See **INSECTS**, Vol. XIII, p. 153.

PLANT PHYSIOLOGY. See **ECOLOGY**, in these Supplements.

PLANTS. See **BOTANY**, Vol. IV, p. 79; and **VEGETABLE KINGDOM**, Vol. XXIV, pp. 124-131.

PLANTS, FOSSIL. See **DISTRIBUTION**, Vol. VII, pp. 286-290.

PLANULA STAGE. See **HYDROZOA**, Vol. XII, p. 557.

PLAQUEMINE, a town and the capital of Iberville Parish, in central southeastern Louisiana, 12 miles S. of Baton Rouge, on the Mississippi River, and on the Texas and Pacific railroad. It has saw and shingle mills; is a shipping-point for cotton and sugar, and has a state bank, the Academy of St. Bazil (Roman Catholic), and a daily paper. Population 1890, 3,222.

PLASSY, BATTLE OF. See **CLIVE**, Vol. VI, p. 10.

PLASTER OF PARIS. See **GYP SUM**, Vol. XI, p. 351.

PLASTIDS, in botany, are certain organized cell-contents which are widely variable in form. When colorless they are called *leucoplastids*; if colored, they are known as *chromatophores*. The best-known plastid is the one colored with the green coloring-matter *chlorophyll*, and known as a *chloroplastid*. When chromatophores contain no chlorophyll they are known as chromoplastids, yellow being the most common coloring-matter.

PLATE-GLASS INSURANCE COMPANIES. See **ACCIDENT AND CASUALTY INSURANCE**, in these Supplements.

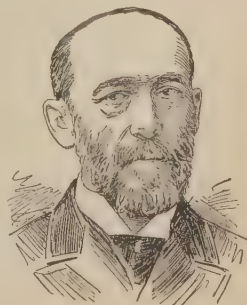
PLATINIRIDIUM. See **MINERALOGY**, Vol. XVI, p. 383.

PLATINOTYPE PROCESSES. See **PHOTOGRAPHY**, in these Supplements.

PLATONISTIDÆ. See **MAMMALIA**, Vol. XV, p. 397.

PLATT, ORVILLE HITCHCOCK, an American public man; born in Washington, Connecticut, July 19, 1827. He received an academic education; studied law at Litchfield; was admitted to the bar in 1849, and afterward practiced law in Meriden; was clerk of the state senate of Connecticut in 1855 and 1856; was secretary of state in 1857; was a member of the state senate in 1861 and 1862; was a member of the state house of representatives in 1864 and 1869, serving the last year as speaker; was United States Senator from 1879 to 1891, and was re-elected for the term expiring in 1897.

PLATT, THOMAS COLLIER, an American politician; born in Oswego, New York, July 15, 1833; entered Yale College, but had to leave in 1853, on account of ill health; in 1876, however, he received the honorary degree of M.A. He became president of the Tioga (New York) National Bank, and also engaged in lumbering in Michigan. In 1872 he was elected to Congress and re-elected in 1874. Upon the expiration of Francis Kernan's term as United States Senator he was chosen his successor, Jan. 18, 1881. In the following May, in consequence of the troubles with President Garfield in regard to Federal appoint-



THOMAS C. PLATT.

ments in the state, he, with Senator Conkling, resigned, and failed of re-election. He retired temporarily to private life, and was elected president of the U. S. Express Co. in 1880. Becoming prominent as manager of Republican affairs in the state, in 1896, he took a leading part in the Republican national convention. He withheld his name in the state convention as a candidate for the governorship, and in 1897 was elected to the U. S. Senate.

PLATT-DEUTSCH. See GERMANY, Vol. X, p. 516.

PLATTE RIVER. See NEBRASKA, Vol. XVII, P. 307.

PLATTSBURG, a village of the state of New York. Plattsburg has two public libraries, four national banks with a combined capital of \$400,000, a state normal school and one daily and two monthly newspapers. It is the home of the Roman Catholic Summer School of America. Population 1890, 7,010. See also PLATTSBURG, Vol. XIX, p. 213.

PLATTSMOUTH, a city and the capital of Cass County, east-southeastern Nebraska, 19 miles S. of Omaha and 22 miles N. of Nebraska, on the Missouri River, and the Burlington and Missouri River, the Chicago, Rock Island and Pacific and the Missouri Pacific railroads. It has grain, lumber and cattle trade, large railroad machine-shops, flour-mills, canning factories, four cigar factories, brick and terra-cotta works, and carriage and wagon factories. Plattsburgh has 8 public-school buildings, 11 churches, an opera-house recently constructed at a cost of \$50,000, a courthouse and a good sewerage system, and improved water-works, 1 national and 2 state banks and 3 daily papers. Population 1890, 8,392.

PLATTVILLE, a village of Grant County, southwestern Wisconsin, 23 miles N. of Galena and 62 miles W.N.W. of Madison, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. Its manufactures include a powder-mill, flour-mills, carriage, plow and wagon factories and a foundry and machine-shop; is in a lead-mining district, and ships live-stock, grain, lead and powder. Has a state normal school. Population 1890, 2,740; 1895, 3,321.

PLATYHELMINTHES. See TAPE-WORM, Vol. XXIII, p. 49.

PLATYPTERA, a suborder of the pseudoneuropterous insects, including the white ants (*Termitidae*), the stone-flies (*Perlidae*), the death-ticks (*Psocidae*), and others. The term is practically equivalent to the *Isoptera* of some authors.

PLATYRRHINA, a group of monkeys characterized by having a broad, flat nasal septum and the nostrils far apart. The American members of the *Primate* constitute the group. It is opposed to *Catarrhina* (q.v., in these Supplements).

PLAYFAIR, LORD, formerly Sir Lyon, an English chemist and statesman; born in Meerut, India, May 21, 1819. He was educated at St. Andrews University, Scotland; studied chemistry under Graham at the Andersonian University, Glasgow; then returned to India to improve his health, and afterward rejoined Graham at the University of London. He went to Giessen in 1838 to study

organic chemistry under Baron Liebig, and, returning to Scotland, became manager of the calico-print works at Clitheroe, in Lancashire. In 1843 he was appointed professor of chemistry in the Royal Institution there. He was appointed by Sir Robert Peel on the commission to examine into the sanitary condition of the chief British cities, after which he was appointed chemist to the Museum of Practical Geology. He was appointed special commissioner in charge of the department of juries at the Exhibition of 1851, receiving the Companionship of the Bath for his services, and also an appointment as gentleman usher in the household of the late Prince Consort. At the Exhibition of 1862 he again had charge of the department of juries. At the Paris Universal Exposition of 1878, the Prince of Wales appointed him chairman of the finance committee of the British Commission. In 1856 he was made inspector-general of government museums and schools of science. From 1858 to 1868 he was professor of chemistry in the University of Edinburgh. He was a member of numerous royal commissions, and president of that of the Civil Service Commission in 1874. In 1868 he was elected to the House of Commons for the Universities of Edinburgh and St. Andrews, and held the seat for 17 years. He was Postmaster-General from 1873 to 1874. After the election of 1880 he became chairman of Ways and Means, and Deputy-Speaker of the House, which offices he resigned in 1883. He was then made a K.C.B. He was returned for South Leeds in 1885, and sat for that constituency until he was elevated to the peerage in 1892. He was Vice-President of the Council in 1886; Lord-in-Waiting to the Queen from 1892 to 1895, and one of the Council to the Prince of Wales. He was president of the British Association for the Advancement of Science in 1885. He was raised to the peerage as Baron Playfair of St. Andrew's. He was the author of various miscellaneous memoirs on chemical and educational subjects, and edited, with W. Gregory, *Liebig's Chemistry in its Application to Agriculture and Physiology* (1853).



LORD PLAYFAIR.

PLEA. See PLEADING, Vol. XIX, p. 217; ABATEMENT, Vol. I, p. 5; and in these Supplements.

PLEASANT GROVE, a village of Utah County, central northern Utah, 30 miles S.S.E. of Salt Lake City, on the Union Pacific railroad; in a farming and fruit-raising district, and has two churches and a steam saw-mill. Population 1895, 2,301.

PLEASONTON, ALFRED, an American soldier; born in the District of Columbia, in 1824. He graduated at West Point; served in the Mexican War, and was commissioned a major of cavalry in 1862. He served in the Union army in the Virginia campaign, and was commissioned brigadier-general of volunteers in July, 1862. He was in

command of the cavalry that followed General Lee's rear in the invasion of Maryland; and engaged at Boonsboro, South Mountain, Antietam and Fredericksburg. By his efficient action at Chancellorsville he succeeded in checking the advance of Stonewall Jackson and in saving Hooker's army. He was promoted to a major-generalship in June, and was engaged in all the actions leading up to Gettysburg, where he commanded the Federal cavalry, and received the brevet of colonel in the regular army. He was transferred to Missouri in 1864, and succeeded in compelling the retreat of General Price. In 1865 he was brevetted brigadier-general and major-general in the regular army. He was mustered out of the volunteer service, January, 1866, and resigned his commission in the regular army in 1868. He was afterward collector of internal revenue; and later, president of the Cincinnati and Terre Haute railroad. In 1888 he was placed upon the retired list of the army with the rank of colonel, but seemed to regard it as a slight, and afterwards lived in seclusion. He died at Washington, D. C., Feb. 17, 1897.

PLEBISCITE, the name given, in the political phraseology of modern France, to a decree of the nation obtained by an appeal to universal suffrage. Thus, Louis Napoleon, for example, was chosen President and subsequently Emperor, by a plebiscite. The word is borrowed from the Latin; but the *plebiscitum* of the Romans properly meant only a law passed at the *Comitia Tributa*, that is, assembly of the *plebs*, or "commons," as distinguished from the *populus*, or the "nobles"; and although it was ultimately obligatory on both classes of the community, it of course could only refer to such matters as it was within the province of the *Comitia Tributa* to legislate upon, and could not fundamentally alter or destroy the constitution, its powers being thus limited.

PLECOPTERA, a subdivision of the pseudoneuropterous insects. The name refers to the folding of the wings when the insects are at rest. The group includes the stone-flies (*Perlida*).

PLEIADE. See **RONARD**, Vol. XX, pp. 841, 842.

PLEIADES, a group of stars in the constellation Taurus. Six of them are plainly visible to persons with ordinary sight; while persons with keener vision can distinguish eleven or more. More than four hundred stars properly belong to the group, which is now recognized as a single system with Alcyone as the center. The name of the group is derived from Greek mythology. The Pleiades were the seven daughters of Atlas and Pleione, hence were also called Atlantides. Their names were Electra, Maia, Taygete, Alcyone, Celæno, Merope and Sterope. All were visible but the last, who is said to have become invisible from shame, because she alone among her sisters had loved a mortal man. The Pleiades are said to have committed suicide out of grief at the death of their sisters, or at the fate of their father. They were afterward placed by Zeus as stars on the back of Taurus. The rising of the Pleiades in Italy was about the beginning of May, and their setting about the beginning of November. The navigation of the Mediterranean lasted about

the same time. Hence these stars were objects of special interest to sailors in that region. See also **ZODIAC**, Vol. XXIV, pp. 791, 793.

PLEISTOCENE PERIOD. See **GEOLOGY**, Vol. X, pp. 365, 366.

PLESIOPIDÆ, a family of fishes, typified by the genus *Plesiops*, found in the Indian Ocean. The family was so named because of the peculiar approximation of the eyes. Aside from their anatomical features they have little importance.

PLEURA. See **RESPIRATION**, Vol. XX, p. 476.

PLEURODELIDÆ, a family of salamanders (*Urodela*) found in both hemispheres. The name of the typical genus *Pleurodeles* refers to the fact that the ribs protrude through the body-wall, and hence are externally visible. The genus, represented by a single species, is found in southern Europe, especially in Spain. The genus *Diemitylus* contains most of the species of the family, seven being found in North America. The well-known triton of the Eastern states is *D. viridescens*.

PLEURODIRA, a genus of tortoises of the family *Chelydidae*. This family is characterized by the inability to withdraw the neck, but which bends sidewise, and thus the head can be partly concealed beneath the carapace. These reptiles are confined to the southern hemisphere, but related fossil forms are found in the northern. *Chelodines* is an equivalent name.

PLEURONECTES. See **ICHTHYOLOGY**, Vol. XII, p. 692.

PLEURO-PNEUMONIA. See **MURRAIN**, Vol. XVII, p. 60.

PLIMSOLL, SAMUEL, a British philanthropist, the "sailors' friend"; born in Bristol, on Feb. 10, 1824. He was first a solicitor's, then a brewer's, clerk, and in 1854 started business on his own account, in the coal trade, in London. Shortly afterward he began to interest himself in the sailors of the mercantile marine and the dangers to which they were exposed. Failing to induce Parliament to take legislative steps to put an end to the evil, Mr. Plimsoll himself entered Parliament, for Derby, in 1868; but it was not until he had published *Our Seamen* (1873) and had made an appeal to the general public, that he succeeded in getting passed the Merchant Shipping Act in 1876. Mr. Plimsoll sat for Derby until 1880, when he resigned his seat—a sure Liberal constituency—to Sir W. V. Harcourt, who was defeated for re-election at Oxford, on his appointment by Mr. Gladstone Secretary of State for the Home Department. But Plimsoll did not cease his efforts to make the sailor's calling safer; in 1890 he published a work on *Cattle Ships*, exposing the cruelties and great dangers connected with the shipping of live cattle across the ocean to British ports. In 1890 he was made president of the newly organized National Amalgamated Sailors' and Firemen's Union of Great Britain and Ireland, but resigned soon after.

PLIOCENE ROCKS. See **GEOLOGY**, Vol. X, p. 364.

PLIOHIPPIUS. See **HORSE**, Vol. XII, p. 173.

PLOCEIDÆ. See **WEAVER-BIRD**, Vol. XXIV, p. 462.

PLOJESHTI or **PLOYESTI**, a town of Wallachia, 35 miles N.E. from Bucharest, on the Dinbow, a feeder of the Jalomnitza. It is a place of considerable trade, and has a great annual wool fair. Population, about 27,000.

PLOMBIERES, a town in the arrondissement of Remiremont, department of Vosges, northeastern France, about 15 miles S. of Epinal. It is picturesquely situated in the Valley of the Argonne, and is celebrated for its thermal springs, nearly fifty in number, which, owing to their curative powers, have been in use since the days of the Romans. The magnificent baths as they exist to-day were built by Napoleon III. The town has important manufactories of cutlery and other articles in iron and steel. Population 1891, 1,869.

PLOTIDÆ. See *SNAKE-BIRD*, Vol. XXII, p. 188.

PLOTINUS. See *NEO-PLATONISM*, Vol. XVII, pp. 335, 336.

PLoug, **PARMO CARL**, a Danish poet; born in Kolding, Oct. 29, 1813. In his sixteenth year he began to study philology at Copenhagen University, and while still an undergraduate published numerous student-songs under the pseudonym of "Paul Rytter." He became editor of the *Fædrelandet* (*The Fatherland*), in which he did much toward rousing a spirit among native writers to national effort in literature. A collected edition of his poems, *Samlede Digte*, was published in 1861, and in 1869 appeared his *Nyere Sange og Digte*. He was a member of the constitutional convention that drafted the constitution of 1848; was a member of the Folkething from 1854 to 1857, and became a member of the Landsting in 1869. He died Oct. 27, 1894.

PLOWS, AMERICAN. There are numerous special varieties or types of American plows. The sulky plow is mounted on wheels, by means of which the weight of the plow and the furrow-slice are supported, thus reducing the friction and the draft; while the driver or plowman is seated, thus lightening his labor. Swivel or side-hill plows are those with reversible mold-boards, and are capable of being used to turn the furrow either way. These plows are useful in hilly fields, by means of which the furrows can be all turned one way—a great and evident advantage. Great improvements have been made in these swivel plows, and now they are used on level land, so that the "dead" or open furrows which have to be left in the center of the field, which is plowed on both sides, are avoided, as likewise the ridges occurring where the first furrows are laid with the old-style plow. The double Michigan plow has a small paring-plow on the beam in front of the other. The small plow pares off the surface and throws it into the previously made furrow, the large one following and completely burying the first slice under it. Special forms of plowshares are also made for ditching, for making underground channels for carrying off water in clay soils, for paring the turf, for cutting off the roots of weeds, for reclaiming land containing stones, brush, etc., and for other purposes. The Campbell system of cultivation, in vogue in the Dakotas, which consists in

turning the sod or soil over in such a way as to make it as impenetrable to the drouth as possible, has also brought into use a new form of plow. The ingenuity and skill of construction shown so markedly in American plows has been much appreciated abroad, where they have a large sale and have proved to be patterns most worthy of imitation.

PLUMB, PRESTON B., an American statesman; born in Delaware County, Ohio, Oct. 12, 1837. He received a common-school education; learned the art of printing; removed to Kansas in 1856; was a member of the Leavenworth Constitutional Convention in 1858; was admitted to the bar in 1861; served in the lower house of the legislature in 1862, and was chairman of the judiciary committee, and subsequently reporter of the supreme court. In August of the same year, entered the service as second-lieutenant in the Eleventh Kansas Infantry, and served successively as captain, major and lieutenant-colonel of that regiment; was commissioned as colonel of the same regiment in August, 1865, but not mustered, for the reason that a mustering-officer was not within reach until after a part of the regiment had been mustered out. Was a member and speaker of the Kansas house of representatives in 1867, and also a member in the following year; was elected to the United States Senate for three successive terms. He died Dec. 20, 1891.



PRESTON B. PLUMB.

PLUMBING, SANITARY. Plumbing (from the Latin *plumbum*, lead), the art of working in lead, was known to the ancients, but limited to water-supply. Conduits were rolled for this purpose. Sanitary plumbing deals with house-drainage, the ventilation of pipes and appliances and water-supply.

Sanitary plumbing stands in closer relationship to the health of the people than any other art or science. The germ theory of disease, and the fact that the microbe can be prevented from transportation and germination, places sanitary plumbing among the chief factors in all measures for the prevention and removal of disease.

The diseases arising from unsanitary conditions are known as zymotic. They include cancer, consumption, nearly all the diseases of childhood, epidemics, blood-poisoning, insanity, and degeneration of the brain, liver, kidneys and other organs. It is estimated that these diseases annually cause the death of half a million people.

Medical science pronounces the reckless, careless and ignorant disposal of human excremental products the most prolific source of disease. It therefore becomes necessary that they be quickly removed. The underground sewer is the safest means of disposal, but the sewers generate gases that cause the diseases above named. Sewer-gas must therefore be confined, and this is the work of sanitary plumbing. This is impossible, however, without the aid

of state and municipal sanitary law. Sanitary plumbing can prevent the ingress of sewer-gas; it can prevent the impregnation of the soil from dangerous moistures; but where the water-supply has become vitiated, it cannot prevent the return of disease-germs through water-mains. It can only suggest filtration or the boiling of drinking-water. It is therefore of vital importance that sanitary plumbing should be demanded and enforced by state and national legislation.

HOUSE DRAINAGE AND VENTILATION OF PIPES. The trap is the only protection against the ingress of sewer-gas known to sanitary science. A trap is a crook or bend in lead, iron or brass pipe, or other material, which forms a pocket for the retention of water. This water obstructs the passage of sewer-gas. To prevent "siphonage," air must be admitted at the crown of the trap to equalize the atmospheric pressure. The trap most in use is known as the "S" trap. Its water-seal is not over one and a half inches in depth. However properly the trap may be "back-vented" (which is the term for admitting air into the crown of the trap to prevent siphonage), it may lose its seal by evaporation or capillary attraction, and possibly other causes. It is therefore very essential that intelligent care be given to plumbing apparatus. Even if the seal of traps should not be destroyed, the fouling of the water must be avoided by the regular flushing of fixtures. In the house-drainage system, air circulation must be maintained to relieve the pressure of sewer-gas upon the seal of the trap. Under sufficient pressure, sewer-gas will penetrate the deepest water-seal. A "fresh-air inlet" is the method to secure air circulation in the house sewer. The house sewer should be run in as direct a line as possible from the street sewer to the highest point of the roof. From the street sewer to within a few feet of the foundation-wall, salt-glazed or vitrified sewer-pipe is generally used, and should be laid in a bed of cement. All house sewers or drains should have a fall of not less than one foot in fifty.

The main house sewer and trap should be of extra-heavy cast-iron pipe, coated inside and out with pitch or coal-tar applied hot. It should be not less than four inches in diameter, and should extend several feet beyond the foundation-wall. This pipe connects with the trap which cuts off the house system from the street sewer. This trap, which is usually a running or half "S" trap, should be provided with a four-inch hand-hole or clean-out on the sewer side and a four-inch vent-opening on the house side. The hand-hole of this sewer-trap should be air-tight and left easy of access, to expedite cleaning. The vent-opening should be connected with four-inch cast-iron pipe, carried up at least a foot above the ground and properly capped. This constitutes the usual form of fresh-air inlet. Nearly all authorities agree that the fresh-air inlet, whether located in the yard or at the gutter-curb, is essential to the maintenance of air circulation in the drainage system.

All plumbing fixtures, properly trapped and vented, should discharge into this main line of soil-pipe. There should be no trap, other than the one above described, or acute angles in this main

drain. All changes in direction of this pipe should be made with not less than one eighth bends or sanitary "Y" branches, the free openings of which should be fitted with four-inch brass trap-screws to facilitate cleaning. The joints in cast-iron soil-pipe should be packed with spun oakum, filled with molten lead and thoroughly calked. All connections of lead with cast-iron should be made with brass or combination brass ferrules, one end calked into the hub of the soil-pipe and the other joined to the lead pipe by "wiped" or overcast joints. Before fixtures are set, the entire line of house soil-pipe should be left exposed for inspection and test, as a provision against defective joints or sand-holes. The soil-pipe should be securely fastened to the wall, ceiling or joists, with iron hangers or hooks to prevent sagging at the joints and forming pockets for soil obstructions. The main soil-pipe and separate vent-pipes, which extend through the roof, should be increased one inch in diameter by the use of soil-fittings, known as "increasers." The ends of such pipes should remain open or protected by wire-netting. Closets, bathtubs and lavatories can be vented into the main soil-pipe if the vent connection is made two to four feet above the highest fixture discharging into it. Separate vent-pipes, however, can be run from the fixtures directly through the roof. All vent-pipes should have sufficient fall to avoid the accumulation of water by condensation. Rain-water leaders should be trapped at their base and carried through separate sewer drains into the main house sewer on the house side of sewer-trap. Waste-pipes from refrigerators, safes and ice-boxes should not connect directly with the soil-pipe, but should discharge into open sinks properly trapped. Waste-pipes from refrigerators should be trapped at the refrigerator end. The outlets of refrigerator waste-pipes should be protected with flap-valves. Kitchen sinks should be supplied with grease-traps. Grease should not be allowed to enter the drainage system. These traps should be cleaned at least once a week.

HOUSE WATER-SUPPLY. In house water-supply, sanitary plumbing has also to do with the problem of economy and health. The water-supply should be so arranged from its source, that in case of light pressure the drinking-supply could not be contaminated by foul waterlodging in the plumbing fixtures. All water-pipes should drain to certain points, at which should be located stop and waste cocks placed below the frost-line. Rods from these cocks should extend up into the house at convenient points to facilitate the shutting off of the entire house system. Hot-water-pipes from range boilers to bath-rooms should be brass, iron-pipe size, or lead. Lead pipe is subject to the contraction of heat and cold, and must be properly connected and set when used as hot-water conductors. Cold-water pipes from the street-main to fixtures should be extra-strong lead pipe. Exposed pipes on bathroom fixtures should be nickel-plate brass. The supply-pipes of closets should be equipped with separate cut-off cocks above the floor, in order that repairs may be made without disturbing other fixtures. All waste-pipes should be lead. In connecting closets to soil-pipe, brass flanges and rubber,

gaskets should be used. No vent-pipe should be smaller than its trap, except in case of closet-traps, the vents of which should be not less than two inches. All plumbing work should be exposed or placed under movable covers, to facilitate repairs.

FIXTURES. To expedite the work of the sanitary engineer, plumbing fixtures should be intelligently selected. There should be no woodwork or casing around bathtubs, lavatories, sinks, slop-hoppers, closet or laundry trays. Enameled iron, rolled edge or solid porcelain bathtubs and sitz baths should be used. If copper tubs are used they should be of the pedestal style, standing away from the wall and with no woodwork but the bath rim. Closets should be selected with great care. Cheap and defective closets cause great expense to repair, and are dangerous to health. Cheap closets are responsible for the enormous and burdensome water-waste which has grown to such alarming proportions in recent years. The United States consumes one hundred gallons of water a day per capita in the cities. Germany allows only forty gallons per capita and England thirty-four. The water-waste in this country can be almost entirely stopped by economical water-using closets. Sanitary science has made more improvement in closet-building in recent years than in any other line of plumbing apparatus. There is now no excuse for the selection of defective and dangerous closets.

Patrick J. Madden of Chicago is the inventor and patentee of a line of closets which mark a new era in closet-building. These remarkable fixtures combine hygienic and sanitary security, mechanical simplicity, strength and durability. They are especially constructed to overcome water-waste in public and private use. A place is given them here because they are the first closets produced that have successfully passed the disease-germ and mephitic-gas test, securing scientific indorsement. These closets are of the siphon jet type, holding the deepest water-seal yet attained in bowl construction, and entirely overcoming the intermittent outflow which condemned earlier attempts at producing the jet closet. Mr. Madden is the pioneer in embodying his improved jet principle in enameled iron, enameled inside and out. This closet is automatic in action, and designed especially for public-building purposes.

A residence or public building with a system of drainage and water-supply as suggested above, and provided with properly selected plumbing fixtures, is protected against zymotic diseases. Such a system is economical. Cities having sewers should have ordinances to regulate them. Each state should have a law providing a board of commissioners to examine applicants for plumber's license, and to examine applicants for the office of plumbing inspector.

This article necessarily omits a vast amount of detail appertaining to the subject. Much valuable information may be found in the plumbing ordinances of different cities.

JAMES B. CLOW.

ALBERT E. HYDE.

PLUM-KNOT, a name given to *Plowrightia mors-bosa*, a black fungus which attacks the twigs of the

plum and cherry, producing black, knot-like masses. The young bark is penetrated by the parasitic threads, which in spring multiply greatly, and finally break through the bark, forming a dense tissue which grows rapidly and becomes almost solid, with a black velvety appearance. These knots bear the spores, which fall off easily and spread the disease. The parasite is often quite injurious, and the knots should be cut off as soon as they appear.

PLUMMER, WILLIAM, an English astronomer; born in Deptford, in Kent, in 1849. He entered the service of the Royal Observatory, Greenwich, and in 1870 became connected with Bishop's Twickenham Observatory, which was engaged in the formation of charts of the stars situated near the ecliptic, to facilitate the discovery of minor planets. Then, on the establishment of the Oxford University Observatory in 1874, he was appointed assistant, where he was engaged in photometric and meridional observations. In 1892 he was appointed astronomer to the Mersey Docks and Harbor Board, and director of the Liverpool Observatory. He was elected a member of the Royal Astronomical Society in 1879, and to a seat on the Council in 1888. In 1889 he received the honorary degree of M.A. from the University of Oxford. He wrote *The Motion of the Solar System in Space; The Sideral System*; etc.

PLUM-POCKETS, a disease of plums caused by the parasitic fungus *Exoascus pruni*. Through the attacks of this fungus the plums become cupped and swollen.

PLUMPTRE, EDWARD HAYES, an English ecclesiastic; born in London, Aug. 6, 1821; educated at University College, Oxford, where he graduated in 1844.* He became a fellow of Brasenose College in 1844. He was for six years (1869-74) one of the Old Testament company of the committee of revisers of the authorized version of the Bible appointed by convocation. He was installed dean of Wells, Dec. 21, 1881. His works include *The Study of Theology* (1853); *King's College Sermons* (1859); *The Book of Proverbs in its Bearing upon Theology and Life* (1864); *Lazarus, and Other Poems* (1864); *The Tragedies of Sophocles* (1865); *Theology and Life* (1866); *Master and Scholar, and Other Poems* (1866); *Christ and Christendom*, Boyle lectures (1866); *The Tragedies of Æschylus* (1868); *Biblical Studies* (1870); *Respice, Aspice, Prospice, and the Law of Progress in Theology* (1876); *St. Paul in Asia Minor and the Syrian Antioch* (1877); *Movements in Religious Thought: I, Romanism; II, Protestantism; III, Agnosticism* (1879); *An Introduction to the New Testament* (1883); *The Divina Commedia and Canzoniere of Dante* (1886); *Wells Cathedral and Its Deans* (1888); *The Life and Letters of Thomas Ken, D.D., Bishop of Bath and Wells* (1888).

PLUTONIC ROCKS. See GEOLOGY, Vol. X, pp. 307-313.

PLYMOUTH, the great southwestern port of England, in Devonshire, and on the north side of Plymouth Sound, 42 miles S.W. of Exeter and 246 W.S.W. of London. What is known as Plymouth is three distinct towns, under separate local governments, and called by the inhabitants the "Three Towns." From the precipitous Hoe, a hill 100

feet high, on the seaward side of the town, with houses climbing up its landward side, a magnificent prospect is obtained of Plymouth and its surroundings. Confining the broad Sound on the south is the breakwater, while on the extreme verge of the horizon rises the Eddystone Lighthouse. The mother-church of Plymouth, St. Andrew's, is a fine specimen of the characteristic church architecture of the Perpendicular period, to which date it mainly belongs. In 1874-75 it was "restored" by the late Sir G. G. Scott. Other churches are Charles's Church, Christ Church Trinity, All Saints', St. Matthias's, St. Jude's, St. Luke's, St. Peter's, St. James's, and many others; the Roman Catholic cathedral (founded 1856), a fine early-English structure, with a tower 205 feet high; and several modern Dissenting chapels. The number of small religious bodies is exceptionally large, comprising Universalists, Bible Christians, Moravians, Christadelphians, Plymouth Brethren, Calvinists, etc. The chief secular building is the Guildhall, an early-English structure built in 1870-74, and forming, with the municipal buildings, St. Andrew's Church, and the new general postoffice adjoining, a picturesque and harmonious group. Other remarkable buildings are the South Devon and East Cornwall Hospital; the Royal Hotel and Theater; the Duke of Cornwall Hotel, at the Millbay railway station; the Plymouth Institution (literary and scientific), extended by the addition of a museum in 1829; the Mechanics' Institute; Co-operative Hall; Freemasons' Hall, and People's Palace; the Technical and Science and Art schools (built to commemorate the jubilee of the reign of Queen Victoria), and the Grand Hotel upon Hoe. The War Department in 1885 presented the corporation with the whole of the outworks and glacis of the Citadel—sixteen acres, which have been added to the Hoe, and have increased the attractions of this historic quarter; and on it has been erected the *first* marine biological laboratory and aquarium in the kingdom—a fine building devoted to scientific researches into the habits and culture of fish and economic development of the fishing industry. Plymouth now rivals Southampton as a station for the mail-steamers, and, as a port of call, is the headquarters of the Royal Western Yacht Club of England. It is one of the chief ports in the kingdom for the importation of cattle, and also largely imports sugar, saltpeter, hemp, hides, timber, grain and wine. The industrial products, widely exported, are principally chemicals, soaps, artificial manure, starch, black-lead, refined sugar, gin, biscuits, candles, cement, and the beautiful native marbles. There are considerable shipbuilding-yards, foundries, engineering, clay and stained-glass works, tar distilleries; while in the district are serge factories, paper and shoddy mills, granite quarries. The town sends two members to Parliament, and Devonport, with Stonehouse, the same number. Population of Plymouth Parliamentary borough, 87,480; and county borough, 84,248.

PLYMOUTH, a city and the capital of Marshall County, northern Indiana, 40 miles N. of Logansport and 24 miles S. of South Bend, on the Yellow

River, and on the Pennsylvania, Lake Erie and Western and the Vandalia Line railroads; has flour, saw and planing mills; lumber and grain are extensively shipped. Population 1890, 2,723.

PLYMOUTH, a port of entry and the capital of Plymouth County, Massachusetts. It is situated 37 miles S.E. of Boston, on the Plymouth division of the New York, New Haven and Hartford railroad (Old Colony System). The township, which includes the villages of Chiltonville, North Plymouth, Cedarville, Ellisville, Halfway Pond, South Plymouth, West Plymouth, Red Brook, Saquish, Wellingsly and Manomet, has for its principal industries the manufacture of cordage, cotton duck, bedfastenings, tacks, nails, woollens, boots and shoes. Population 1895, 7,957. The landing-place of the Pilgrim Fathers (q.v., in these Supplements), and the oldest town in New England, Plymouth received appreciative treatment in Vol. XIX, p. 238.

Pilgrim Hall, erected in 1824 by the Pilgrim Society, as a memorial hall to the memory of the



PILRIM HALL, PLYMOUTH.

Pilgrims, was built over and remodeled in 1880 at the expense of J. H. Stickney, of Baltimore, Maryland, one of the vice-presidents of the Pilgrim Society. Within its walls is displayed a collection of paintings relating to Pilgrim history, three of which, by their size and beauty, are especially prominent. The first in point of time is *The Landing of the Pilgrims at Delft Haven*, by Henry Sargent, of Boston, presented by him to the society in 1834. It measures 13 by 16 feet. Next comes a copy of Weir's *Embarkation of the Pilgrims*, from the original in the capitol at Washington. It was painted for the society by Edgar Parker, of Boston, and measures 8 by 12 feet. The third is the *Embarkation from Plymouth, England*, painted by an English artist and presented to the society by ex-Governor Alexander H. Rice, of Boston. Its size is 11 by 12 feet. In addition to these, there are portraits of persons eminent in Pilgrim history; a large collection of articles brought over in the *Mayflower*, and in a lower hall a general collection of curiosities of much interest.

One of the most prominent features of the town is the National Monument to the Forefathers. The corner-stone was laid Aug. 2, 1859; the main pedestal was put in position in 1876, and the statue of

Faith erected in the following year. The monument was completed in October, 1888, and dedicated with appropriate ceremonies on Aug. 1st, 1889. The entire work was under the control of Hammatt Billings, who drew the design for the monument in all its details. Massive in its grandeur, it is built entirely of granite, the statues all being quarried by the Hallowell Granite Company of Maine. The plan of the principal pedestal is octagonal, with four small and four large faces, from the former of which project four buttresses. On the main pedestal stands the colossal figure of Faith, the largest and most inspiring piece of granite statuary in the world. It is 216 times larger than life size, and weighs over two hundred tons. The pedestal is 45 feet high and the statue 36 feet, making a total height of 81 feet. The outstretched arm measures, from the shoulder to the elbow, 10 feet 1½ inches; from the elbow to the top of the uplifted finger, 9 feet 9 inches. The head measures 13 feet 5 inches around the temples. The points of the star on the forehead are just 1 foot across. The length of the finger pointing upward is 2 feet 1 inch, and it measures 1 foot 8½ inches around. The circumference of the wrist is 4 feet, and of the neck 9 feet 2 inches. This noble figure was the



NATIONAL MONUMENT, PLYMOUTH.

gift of Oliver Ames, of Easton, a native of Plymouth, and cost \$30,300. The sculptor was Joseph Archie, a Spaniard, considered one of the most skillful artists in the country. Upon the four buttresses are seated figures emblematical of the principles upon which the Pilgrims founded their commonwealth—Morality, Education, Law, and Freedom. Each was carved from a solid block of granite. On the faces of the buttresses, beneath the four figures, are *alto-relievos* in marble, representing scenes from Pilgrim history. The statue of Morality was presented by the state of Massachusetts; the marble tablet beneath it with the scene of the Departure from Delft Haven, by the state of Connecticut. The statue of Education, with the panel under it, representing the Signing of the Social Compact in the cabin of the *Mayflower*, was the gift

of Roland Mather, of Connecticut. The statue of Freedom, with its accompanying *alto-relievo* of the Treaty with Massasoit, was the gift of the United States. The statue of Law, with the relief of the Landing on Plymouth Rock, was mainly contributed by the legal profession. Upon the four faces of the main pedestal are large panels for records. That in the front bears the inscription: "National Monument to the Forefathers. Erected by a grateful people in remembrance of their labors, sacrifices and sufferings for the cause of civil and religious liberty." The right and left panels contain the names of those who came over in the *Mayflower*. The rear panel has been left blank for an inscription at some future date. See also PILGRIM FATHERS, in these Supplements.

PLYMOUTH, a village of Wayne County, southeastern Michigan, 24 miles W.N.W. of Detroit, on the Detroit, Lansing and Northern and the Flint and Père Marquette railroads; has a large windmill factory, washing-machine, cheese and air-rifle factories, and various other industries. Population 1890, 1,172; 1895, 1,204.

PLYMOUTH, a village and one of the capitals of Grafton County, central New Hampshire, 37 miles N.N.W. of Concord and 19 miles N.W. of Laconia, on the Pemigewasset River, and on the Boston and Maine railroad; has manufactures of buckskin gloves, shoes and boxes, and a state normal school. Population 1890, 1,852.

PLYMOUTH, a town and the capital of Washington County, eastern North Carolina, 105 miles E. of Raleigh, on an inlet which opens into the west end of Albemarle Sound, and on the Atlantic Coast railroad. It is partly supported by the coasting trade and fishing; cotton and lumber are shipped here; steamers leave here for Baltimore and Norfolk. Population 1890, 1,212.

PLYMOUTH, a village of Richland County, northern Ohio, on the Huron River, and on the Baltimore and Ohio and the Northern Ohio railroads; has saw, planing and flour mills, carriage and wagon shops. Population 1890, 1,133.

PLYMOUTH, a borough of Luzerne County, Pennsylvania. It has a high-school, four public-school buildings, a national bank, and three weekly papers. Population 1890, 9,344. See PLYMOUTH, Vol. XIX, p. 238.

PLYMOUTH, a village of Sheboygan County, east-southeastern Wisconsin, 15 miles W. of Sheboygan and 51 miles N. of Milwaukee, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads, and on the Mullet River; has furniture and chair factories, foundry and machine-shop, breweries and flour-mills. Cheese is extensively manufactured in the vicinity; is in a dairying and grain-raising section. Population 1890, 1,503; 1895, 2,213.

PLYMOUTH ROCK, a bare rock on "the bleak coast of Massachusetts Bay," upon which the Pilgrim Fathers (q.v., in these Supplements) landed Dec. 21, 1620, "while all around the earth was covered with deep snow." The rock became known as Plymouth Rock. The first persons supposed to have stepped upon the famous rock were Mary Chil-

ton and John Alden. Though tradition has not entirely determined this interesting point, the landing is itself a matter of certain tradition; elder Thomas Faunce, in 1741, then in his ninety-first year, declaring that he had heard of it from the oldest planters. In process of time one part of the rock became broken, and in 1774 it was taken to the center of the town of Plymouth and surrounded by an iron railing. This portion was dragged into its new position by twenty yokes of oxen. Over this stone in this position the Whigs erected a liberty-pole. In 1880 the stone was returned to its original position at Hedge's Wharf. See also PLYMOUTH, in these Supplements.

PLYMPTON, GEORGE WASHINGTON, an American physicist; born in Waltham, Massachusetts, Nov. 18, 1827; graduated at Rensselaer Polytechnic Institute, Troy, New York, in 1847; professor of engineering and architecture at Cleveland University in 1852-55; professor of physical science at the Brooklyn Polytechnic Institute in 1863; of chemistry and toxicology in the Long Island College Hospital in 1864; and of physics at Cooper Institute in 1869. He was chief engineer of the water-supply and drainage of Bergen, New Jersey, in 1867-69; commissioner for electrical subways for Brooklyn, in 1885-89; and became a member of the American Society of Civil Engineers in 1868. He published *The Blowpipe* (1859); *The Starfinder* (1878); *The Aneroid* (1880); translated *Guide to the Determination of Rocks: Introduction to Lithology*, by E. Jannettaz (1877); edited *Eclectic Engineering Magazine* (1870-96).

PNEUMATIC DYNAMITE GUN. See DYNAMITE GUN, in these Supplements.

PNEUMATIC SULKY, a trotting-sulky having pneumatic tires on the wheels. These wheels were first tried as an experiment, the idea being borrowed from the bicycle. Previously, it was supposed that a light wooden wheel, of about four feet diameter, was the best thing for a trotting-sulky; but the smaller pneumatic-tired wheel was found to reduce the time for a mile by three or four seconds, and has been universally adopted for trotting-sulkies, the seat of the driver remaining at the former height, a special framework being adopted to accommodate it to the low wheels.

PNEUMATIC TIRES. See BICYCLE, in these Supplements.

PNEUMATIC TRANSMISSION. See PNEUMATIC DESPATCH, Vol. XIX, p. 289; and AIR-COMPRESSORS, AND USES OF COMPRESSED AIR, in these Supplements.

PNEUMOGASTRIC NERVE. See PHYSIOLOGY, Vol. XIX, p. 43.

POCAHONTAS, a town of Tazewell County, western Virginia, 33 miles N. of Marion, on the Norfolk and Western railroad. Here is located one of the largest mines of bituminous coal in the state, employing several hundred miners. Population 1890, 2,953.

POCAHONTAS. See SMITH, Vol. XXII, p. 175 (note).

POCHIN, HENRY DAVIS, an English chemist; born in Wigston, Leicestershire, in 1824; studied

chemistry at the Pharmaceutical Society of London; and engaged in business as a manufacturing chemist in Manchester. He discovered the means of decomposing China clay (silicate of alumina) by sulphuric acid, and patented the process in 1855, the material being introduced into commerce as "aluminas cake." It is used by paper-makers for sizing paper. He also patented, in conjunction with Mr. Edward Hunt, a process for the purification of rosin by means of distillation. The rosin resulting from this process of purification is largely used in making pale yellow soaps, and is the foundations of almost all fancy soaps. He took great interest in educational matters, and published *Parliamentary Reform*, a pamphlet which met with favor.

POCOMOKE RIVER. See MARYLAND, Vol. XV, p. 603.

PODESTA. See ITALY, Vol. XIII, p. 474.

PODGORITZA. See MONTENEGRO, Vol. XVI, p. 781.

PODICIPEDIDÆ. See GREBE, Vol. XI, p. 79.

POE, ORLANDO METCALFE, an American engineer; born in Navarre, Ohio, March 7, 1832; graduated at West Point in 1856, and was assigned to the engineer corps, and engaged on lake-survey duty until 1861. He then served as chief engineer in the Department of the Ohio and on the staff of General McClellan; was then appointed colonel of the Second Michigan Volunteers, serving with the Army of the Potomac until the end of 1862, when he was appointed brigadier-general. He afterwards served as chief engineer of the Twenty-third Corps of the Ohio, and also of Sherman's army in its invasion of Georgia and march to the sea. After the war he was engineer-secretary of the United States Lighthouse Board, 1865-70; constructed the lighthouse on Spectacle Reef, Lake Huron, 1870-73. From the latter year until 1884 he was aide-de-camp on the staff of the general of the army, and member of the lighthouse board, 1874-84. He was a member of different boards charged with the construction of river and harbor works on the great lakes, among which being the lock at the Ste. Marie's Falls Canal. He held the actual rank of colonel of engineers, and received brevets of successive rank up to and including that of major-general in the regular army.

POET LAUREATE. See LAUREATE, POET, in these Supplements.

POEY, ANDRÉS, a Cuban scientist; born in Havana, in 1826; the son of Felipe Poe. When 22 he began to write articles on meteorology, and contributed largely to French, Spanish and English journals. He was director of a meteorological observatory at Havana, and occupied a similar position at Mexico, under Maximilian. His works include *Tratado de Meteorología*; *Memoria Sobre los Huracanes de las Antillas*; *Memoria Sobre las Granizadas en Cuba* (1860-62); *Cuban Antiquities*; and *Travaux sur la Météorologie et la Physique du Globe* (1876).

POEY, FELIPE, a Cuban naturalist; born in Havana, May 26, 1799. He graduated in law at the University of Madrid, but gradually abandoned his practice as a lawyer and devoted himself to the study of natural history. In 1827 he aided in

founding the *Société Entomologique* in Paris, and contributed notes and drawings to the *Histoire Naturelle des Poissons*. In 1833 he returned to Havana, and in 1842 was appointed professor of comparative anatomy and zoölogy in the University of Havana. From 1851 until 1860 he published at intervals his *Historia Natural de la Isla de Cuba*. He was appointed in 1863 to the chair of botany, mineralogy and geology, and from 1868 to 1875 brought out his extensive work, *Synopsis Piscium Cubensium*. This work was purchased by the Spanish government, and received a gold medal and honorable mention at the Exposition of Amsterdam in 1883. Poey was a member of almost every scientific society in Europe and America, and his specimens in life-drawings are to be found in the United States National Museum and the Spanish Museum of Madrid. His other works, besides the *Historia Natural de la Isla de Cuba* (1851-60), are *Geografia Universal* (1836); *Corona Poeyana* (1844); and *Geografia de Cuba* (1855). He died in Havana, Jan. 28, 1891.

POGE, CAPE, the northern point of Chappaquiddick Island, Dukes County, off the S.E. coast of Massachusetts, in lat. $41^{\circ} 26' N.$ and long. $70^{\circ} 27' W.$ A wooden lighthouse, 36 feet high, with white light of the fourth order, is placed upon the point.

POGODIN, MICHAEL PETROVITCH, a Russian historian and archæologist; born in Moscow, Nov. 23, 1800; graduated from the University of Moscow, of which he became professor in 1830, resigning in 1844 to devote himself entirely to archæological researches. His great historical work, *Isledovaniia, Zamietchaniia i Lektsie*, extended to seven volumes, and was published from 1846-54. He was unable to complete this work, but the government purchased his historical collections in 1852. He wrote a series of novels and dramatic pieces, among the latter being *Marfa the Passadnitsa* (1831). He founded the *Moskvitianin* in 1841 and *Russki*, a literary and political periodical, in 1867. In 1831 he published *The Origin of the Russians and The Historical Basis of Serfdom*. He was one of the founders of the Moscow Slav Committee, and was a Panslavist. He died in Moscow, Dec. 8, 1875.

POINSETT, JOEL ROBERTS, an American statesman; born in South Charleston, South Carolina, March 2, 1779; studied in England and Scotland, and traveled much in early life; was sent by President Madison to Chile to make a report on the revolution in that country; was elected to Congress from his state in 1821; United States minister to Mexico in 1822, and from 1825 to 1829; United States Secretary of War from 1837 to 1841. He founded the Academy of Fine Arts in Charleston, South Carolina, and aided liberally in the endowment of the national institution. He published *Notes on Mexico* (1824); died in Statesburg, South Carolina, Dec. 12, 1851.

POINT ALPHABET. See BLIND, in these Supplements.

POINTE À PITRE, a town. See GUADELOUPE, Vol. XI, p. 230.

POINT PLEASANT, a village and the capital

of Mason county, western West Virginia, on the Ohio River, near the Kanawha, and on the Ohio River railroad. It produces machinery, flour, barrels, lumber, coal and salt. Population in 1890, 1,853.

POINTER. See DOG, Vol. VII, p. 330.

POISON-IVY, a name given to *Rhus toxicodendron* a plant of the family *Anacardiaceæ*, and common everywhere in low grounds, climbing by rootlets over rocks, ascending trees, etc. It may be recognized by its three ovate, often-toothed leaflets, which are somewhat downy beneath. It is poisonous to the touch for most people. The allied *R. venenata*, poison sumach, is still more virulent. The other members of the genus are the well-known sumachs.

POISON OF SERPENTS. See SNAKES, Vol. XII, pp. 191, 192.

POISONOUS FOOD. See MEDICAL JURISPRUDENCE, Vol. XV, pp. 781, 782.

POKEWEED FAMILY, a small family represented in the United States by the single species *Phytolacca decandra*, or common pokeweed. It is also called soko or garget, and is a well-known coarse herb of low ground, with large, poisonous root, long racemes of white flowers, and dark crimson-purple, juicy berries.

POLAND, LUKE POTTER, an American jurist; born in Westford, Vermont, Nov. 1, 1815. He was admitted to the bar in 1836, and in 1848 was the Free-Soil candidate for lieutenant-governor. In the same year he was elected a judge of the Vermont supreme court, and was re-elected each succeeding year, becoming chief justice in 1860, until he was appointed in November, 1865, to serve out the unexpired term of Jacob Collamer in the United States Senate. He afterward entered the House of Representatives, and served from 1867 until 1875. While in the Senate he secured the passage of a bankrupt law. As a member of the House he was chairman of the committee to investigate the outrages of the Ku-Klux Klan, and of the investigation committee on the Crédit Mobilier transactions; also of a committee on the reconstruction of the Arkansas state government. He was again sent to Congress, in 1883, serving until March 3, 1885. Died in Waterville, Vermont, July 2, 1887.

POLAR CLOCK, a device of Sir Charles Wheatstone's, based upon the fact that the light of the sky is reflected light, and therefore partially polarized, its plane of polarization being always at right angles to the sun. The instrument will indicate the apparent time of the sun, so long as there is any space of blue sky near the polar star exposed for observation. As the earth turns on its axis, giving the sun an apparent motion from east to west, the beam of light reflected from the clear space in the sky will follow these variations in position and indicate them upon a suitable plate or dial. The result is a close approximation to solar time.

*POLAR EXPLORATIONS SINCE 1880. ANT-ARCTIC. In the summer of 1892-93 the Norwegian Captain Larsen, in the *Jason*, discovered on the east coast of Seymour Island, $64^{\circ} 10' S.$, $57^{\circ} W.$, fossils of coniferous trees, possibly pertaining to the

lower tertiary age, which indicate a warmer Antarctic climate in ages past. The next summer, in the year 1893, Larsen made extensive discoveries, which clearly demonstrated that Palmer Land of 1821 extends uninterruptedly southward and forms part of the continent of Antarctica. Larsen on Dec. 6, 1893, reached $68^{\circ} 10' S.$, $60^{\circ} W.$, the coast which he followed being high, rocky, and mostly covered with ice. From his farthest point, high land, covered with snow, was seen in about $69^{\circ} S.$, from 55° to $60^{\circ} W.$ East of Graham Land—the southern extension of Palmer Land—in $65^{\circ} 7' S.$, $58^{\circ} 22' W.$, were discovered seven islands, two of them covered with volcanoes, which Larsen visited. In 1894 Captain Svend Foyn, in the Norwegian whaler *Antarctic*, visited the southern seas for whales. The Antarctic circle was crossed in $174^{\circ} E.$ on Dec. 31. After 38 days in the ice-pack, Foyn found open water, and, steering for Victoria Land, reached $74^{\circ} S.$ Landings were made on Possession Island and at Cape Adare, Jan. 23, 1895, where innumerable penguins were found nesting. The significance of this voyage, along the coast discovered by Ross in 1842, lies in the discovery by a Norwegian, C. E. Borchgrevink, both at Cape Adare and on Possession Island, of a lichen, the first vegetable growth ever noted within the Antarctic circle.

ARCTIC. Since 1876 Denmark, through its officers and scientists, has made most extensive exploration in Greenland, from Cape Farewell to the 66th parallel on the east coast and to the 76th on the west. Over 2,000 square miles have been exhaustively examined to the westward alone; investigations have related to the inland ice, its debouching glaciers, the flora and fauna of its ice-free coast, and the physical conditions of the adjacent sea. On the east coast special studies have been made of the east-Greenland natives, an isolated people numbering 600 souls.

In the Julianhaab district, Holm in 1880 visited 300 prehistoric ruins, comprising well-built stone churches, crosses, etc., which proved their builders to have been European and Christian. These archaeological explorations were continued in 1894 by Lieutenant Brunn, with interesting results. In this district, in 1893, Lieut. T. V. Garde crossed the inland ice from Sermiatsialik fiord to Ikersauk, passing the ice-crest at an elevation of 7,300 feet in $61^{\circ} 54' N.$, 100 miles inland.

On the east coast, extensive explorations were made in 1883-85 by Holm, Garde and Knutsen. At Lindenows fiord, $62^{\circ} 15' N.$, were found Scandinavian ruins. In a journey to $66^{\circ} 8' N.$, along a coast lined with extraordinarily high icebergs, five ice-fiords were discovered, and the natives report another in $68^{\circ} N.$ Wintering at Angmasalik, $65^{\circ} 57' N.$, among natives who had never seen Europeans, Holm gathered most interesting ethnological data. South of the 68th parallel there were 500 Eskimo, some fair-haired, with wonderfully oval and European-like faces. In 1891 Lieutenant Ryder wintered in Scoresby Sound, $70^{\circ} 27' N.$, $26^{\circ} W.$, explored several fiords 50 miles inland, and found the mainland ice-clad. Ryder saw 160 flowering-

plants, 32 kinds of birds and many mammalia. Following the explorations of the east coast, Denmark has established a missionary, trade and meteorological station at Angmasalik, which, annually visited by government vessels, insures the future welfare of the natives. In 1893 R. Knudsen explored the east coast near the 68th parallel, and made important corrections in the charts of the coast between 29° and $40^{\circ} W.$

Exploration in Greenland was immensely stimulated by Nordenskiöld's initiation across its ice-cap. His second journey was made in 1883, from the head of Aulitsvik fiord, south of Disco Bay. Crevasses stopped the main party, July 21, in $48^{\circ} 15' W.$, at an elevation of 4,900 feet. His Lapps proceeded on *skis* 140 miles farther, to 6,600 feet, in $68^{\circ} 32' N.$, $42^{\circ} 50' W.$ The crest of the ice was still to the east, but they were then nearer to Sermilik fiord of the east coast than to their starting-point. Later, Nordenskiöld rounded Cape Farewell in the *Sofia*, followed the east coast, and, passing Graah's farthest, discovered and explored King Oscar harbor, $65^{\circ} 35' N.$, $37^{\circ} W.$

The first man to cross Greenland was Dr. Fridtjof Nansen, who started from the east coast. A Norwegian sealer attempted fruitlessly for weeks to land him, and when Nansen took to boats he was carried 200 miles south by the ice-stream. Landing at Anoritok, $62^{\circ} 5' N.$, he eventually took the inland ice at Umivik, $64^{\circ} 45' N.$, on Aug. 10, 1888, with five sledges. After 17 days they were only 40 miles inland, at an elevation of 7,000 feet, in $64^{\circ} 50' N.$ Constrained by circumstances, Nansen changed his course toward Godthaab, $64^{\circ} N.$, instead of toward Christianhaab, $68^{\circ} N.$ The crest of Greenland proved to be a broad plateau nearly 9,000 feet high, with a gentle western slope that permitted the travelers to sail long distances. They reached, September 29th, Kangarsunek fiord, 60 miles south of Godthaab. This hazardous journey showed that the ice-cap of south Greenland is of unbroken continuity.

More important were the journeys of R. E. Peary, United States Navy, farther to the north. In 1886 he advanced fifty miles inland from Disco, on the ice-cap. In 1891 he made his winter quarters at McCormick Bay, about $77^{\circ} 45' N.$, $71^{\circ} W.$ May 14, 1892, he started across the inland ice with 16 dogs and 4 sledges. From a point 130 miles inland, Peary and Astrup advanced alone. Turned by crevasses from Peterman and St. George's fiords to the east, they reached the north edge of the ice-cap under the 82d parallel, whence across an inlet they saw to the north the comparatively ice-free land discovered by Lockwood in 1882. Eventually, Peary reached, July 4, Navy Cliff, Independence Bay, 4,000 feet high, in $81^{\circ} 37' N.$ To the northeast was an ice-free land extending to $25^{\circ} W.$; to the east, the Spitzbergen Ocean. Killing five musk-oxen, they returned, crossing the divide at 8,000 feet. Renewing his explorations in 1893 from an adjacent base, Bowdoin Bay, with 8 men, 12 sledges and 92 dogs, Peary saw his utmost efforts fail under adverse weather. After traveling 134 miles he cached his food and abandoned the trip, losing 66 dogs. Astrup ex-

plored Melville Bay, and the main party returned to the United States that autumn, but Peary remained another winter, with two men. In 1895, with 6 men (4 Eskimo), 6 sledges and 63 dogs, Peary made a journey of extraordinary danger and difficulty, in which he again reached Independence Bay. Scarcity of game threatened to destroy all, but by strenuous efforts they reached Bowdoin Bay, one dog living and the men reduced to most desperate straits. Peary's successive journeys extended northward on the coast of east Greenland more than 2° of latitude, and, carrying its longitude 15° to the west, tended to prove that the new land of Lockwood is of limited extent. Independence Bay probably connects with Nordenskjöld Inlet (Lockwood, 1882), and bounding Greenland, makes the land to the north separate, as advanced by Greely. The studies by Chamberlain (Peary Relief Expedition) of the Inglefield Gulf glaciers are important contributions.

The most important scientific polar explorations are those of the International Circumpolar stations, established through the efforts of Lieut. C. Weyprecht, Austrian navy, and in accordance with the recommendations of the International Polar Conference of Hamburg, 1879, and of Berne, 1880. The following shows the supporting nations, commanders, localities and years of occupancy of the various stations: *Austria-Hungary*—Lieut. E. von Wohlgenuth, Mary Mussey Bay, 70° N., 8° 23' W. (1882-83). *Denmark*—A. F. W. Paulsen, Godthaab, Greenland, 64° 11' N., 51° 40' W. (1882-83). *Denmark*—Lieut. A. P. Hovgaard, steamer *Dijmphna* (beset in Kara Sea), 71° N., 64° E. (1882-83). *Finland*—S. Lemström and E. Biese, Sodankyla, 67° 24' N., 26° 36' E. (1882-83). *Finland*—Kautokeino (substation), 69° N., 23° E. (1882-83). *France*—Lieut. Courcelle-Seneuil, Orange Bay, Cape Horn, 55° 31' S., 70° 21' W. (1882-83). *Germany*—W. Giese, Kingawa Fiord, Cumberland Gulf, 66° 36' N., 67° 19' W. (1882-83). *Germany*—K. Schrader, Royal Bay, South Georgia, 54° 31' S., 30° 1' W. (1882-83). *Great Britain and Canada*—Capt. H. P. Dawson, Fort Rae, Great Slave Lake, 62° 39' N., 115° 44' W. (1882-83). *Holland*—M. Snellen, steamer *Varna* (beset in Kara Sea), 71° N., 64° E. (1882-83). *Norway*—A. S. Steen, Bossekop, 69° 56' N., 23° E. (1882-83). *Russia*—Lieut. C. Andrejeff, Little Karmakul, Nova Zembla, 72° 23' N., 52° 44' E. (1882-83). *Russia*—Lieut. N. Jürgens, Sagastyr, Lena Delta, 73° 23' N., 124° W. (1882-84). *Sweden*—N. Ekholm, Cape Thorsden, Spitzbergen, 78° 28' N., 16° E. (1882-83). *United States*—Lieut. A. W. Greely, Fort Conger, Grinnell Land, 81° 44' N., 64° 45' W. (1881-83). *United States*—Lieut. P. H. Ray, Point Barrow, Alaska, 71° 16' N., 158° 40' W. (1881-83).

Physical observations and not geographic explorations were the main object and outcome of these expeditions. All surveyed adjacent regions, and in Nova Zembla Dr. Grinetsky crossed from Little Karmakuly to Kara Sea in 1883. Ray, at Point Barrow, sledged in the interior to the foot-hills of Meade Mountains, 69° 55' N., 158° W., and discovered to the east of Dease Inlet Meade River, with a delta of five mouths. The most northern interna-

tional station was at Lady Franklin Bay, 81° 44' N., 64° 45' W., in Discovery Harbor, Grinnell Land, Lieut. A. W. Greely commanding. Buildings were constructed, supplies for two years landed on Aug. 11, 1881, and the transport *Proteus* returned to Newfoundland. Dr. Pavy reached 82° 56' N. on the frozen Arctic Ocean, when a gale April 23, 1882, disintegrated the main polar pack, from which he escaped with indispensable articles. Lieut. James B. Lockwood, after preliminary journeys, in temperatures 81° below freezing, started April 3, 1882, to explore northern Greenland. Reaching Cape Bryant with seven men from Cape Fulford, he ascertained that St. Andrew's and St. George's fiords united, and that western Greenland to the north of the 82d parallel was free from a permanent ice-cap. Striking northward across entirely unexplored regions, Lockwood, with dog-sledge and 25 days' rations, passed Cape Britannia and found land trending to the east-northeast. Despite extraordinary obstacles he reached, May 13, 1882, Lockwood Island, 83° 24' N., 42° 45' W., the highest latitude ever attained on any land. From a cliff 2,600 feet high the frozen sea was seen beyond 84° N., to within 350 miles of the North Pole, and to the northeast Cape Washington, the most northern known land, in 83° 35' N., 38° W. The land which Lockwood discovered was snow-capped mountains, separated by entering fiords. De Long, Chipp, Nordenskjöld and Victoria inlets were immense fiords with no signs of heading, thus indicating the new land to be an archipelago. Foxes, hares, lemmings, ptarmigans and plants showed vegetation for extensive animal life. Extensive explorations of Grinnell Land were made by Greely in two journeys in 1882, during which he ascended Mt. Arthur, 4,500 feet, and discovered remarkable and unexpected physical conditions. An extensive glacial ice-cap covers North Grinnell Land between the Polar Sea and the newly-discovered Garfield Mountains; through breaks in this range, glaciers (one, Henrietta Nesmith, 5 miles wide, 175 feet high) feed Lake Hazen, 500 square miles in area, which drains to the sea through Ruggles River and Chandler fiord. A belt of country, about 150 miles long and 40 miles wide, was entirely snow-free in summer. Luxuriant vegetation affords pasturage for extensive herds of musk-oxen, foxes, hares, etc. In 1883 Greely's discoveries were supplemented by Lockwood and Brainard, who crossed Grinnell Land farther to the south, from Archer to Greely fiord. South Grinnell Land is covered by an enormous ice-cap, which extends unbroken between these two fiords, 80 miles, with a vertical ice-face measuring from 125 to 200 feet. At their farthest, 80° 48' N., 78° 26' W., from cliffs 2,200 feet high Greely fiord proved to be an arm of the western Polar Ocean. Its northern coast ends in Cape Brainard and the southern in Cape Lockwood, 60 miles distant, whence the land possibly trends south to the western extremity of Hayes Sound, in the vicinity of Schley Land. Greely and Lockwood discovered about 6,000 square miles of new land. Its topography and physical conditions satisfactorily explain the cause and manner of the transference, across Grinnell Land and around North

Greenland, to East Greenland of the fleeing musk-ox and pursuing Eskimo from the barren lands of North America and the Parry archipelago.

In addition to botanical, anthropological and zoölogical researches, physical observations were systematically pursued for two years. These observations have been the basis of co-tidal lines of the American Arctic Ocean; have disclosed a sidereal diurnal inequality of the tidal wave; have established a determination of gravity most important for ascertaining the figure of the earth; and have enabled scientists to calculate the secular magnetic variations of the Smith Sound region.

The mismanaged relief ships of 1882 and 1883 failing to reach Discovery Bay, Greely with reduced supplies was obliged to escape southward by boats. Starting August 10, 1883, he succeeded in a dangerous and desperate ice-journey of 400 miles in reaching Cape Hawk in 16 days. Frozen in while crossing to Bache Island, the party experienced the horrors of an ice-drift, but after 34 days effected a landing with all their records and effects, between Capes Sabine and Isabella. Scouring the country and learning of the loss of the relief ship *Proteus* they were obliged to winter at Cape Sabine, whence Garlington's retreating party had carried all available supplies, so that the party found themselves at the beginning of an Arctic winter with 40 days' rations to tide over 8 months. Game was assiduously pursued, but the region was so barren that the food-supply was inadequate and the majority of the party died of starvation. Greely and six remaining men were rescued at the point of death June 22, 1884, by Capt. W. S. Schley and Commander W. H. Emory, who reached them in the United States ships *Thetis* and *Bear*. Scientific observations were kept up to the last, and geographical explorations showed that Cape Sabine is an (B. Pim) island, and Hayes Sound extends westward to Schley Land.

In 1881 the English explorer Leigh Smith visited Franz Josef Archipelago a second time. Sighting Cape Ludlow, June 28, he was driven by unfavorable ice to Northbrook island, where his ship *Eira* was crushed by the ice and sank. By extraordinary energy Smith saved his boats and sufficient supplies, supplemented by hunting, to last through the winter. Leaving Northbrook island the middle of June, 1882, it was August before they reached the open sea. Following the west coast of Nova Zembla they reached, unaided, Matthew Strait, where, on August 3, 1882, they met the Dutch surveying schooner *Willem Barents*. This schooner under various Dutch officers has spent eight consecutive summers, 1878-86, surveying hydrographically Barents Sea almost to the southern shores of Franz Josef Land. An expedition under the English explorer E. F. Jackson is still (April, 1896) engaged in exploring Franz Josef Archipelago. Sailing in the *Windward*, Jackson landed Sept. 7, 1894, near Cape Flora, where he erected portable houses. Unexpectedly frozen in, his ship wintered with unfortunate results, and in 1895, after a voyage of 65 days through an ice-field 300 miles wide, reached Vardö with 12 of her crew scurvy-stricken and 2 dead. She

brought news that having laid out depots as far as $81^{\circ} 20' N.$, about $50^{\circ} E.$, Jackson started in May, 1895, on his main journey of northern discovery. It appears from the earlier journal of Jackson that Franz Josef Land, to the westward of Austria Sound, consists of small detached islands instead of extensive land-masses, there being only a frozen ocean in sight from $80^{\circ} 36' N.$, $50^{\circ} 5' E.$

The explorations of the past ten years appear to indicate that Spitzbergen and Franz Josef archipelagoes are united by a series of small islands along the 80th parallel. In 1884 Captain Kjeldsen and Sorrenson discovered independently a small (White) island. In 1887 Capt. V. H. Johannesen discovered another island, in lat. $80^{\circ} 10' N.$, long. $30^{\circ} 3' E.$, several degrees to the east of Northeast Land. This high mountainous land is not more than one hundred nautical miles distant from Cape Lofley, the westerly known point of Franz Josef Land. In 1884 Captains Johannesen, Hemming and Andreasen visited King Charles Land to the east of Spitzbergen. Their observations determined that this land had been charted by the Norwegian whalers of 1872 about 8° of longitude too far to the east. It also appeared that there are at least three islands instead of one, this coinciding with Altman's opinion of 1872. These islands were fully visited in 1889 no less than four times by Dr. W. Kukenthal, who fully explored their fauna and flora.

A Russian scientist, K. Nossilif, passed three winters, from 1888 to 1891, on the southern island of Nova Zembla. A very considerable portion of the island was surveyed, whereby iron, copper, gold and coal were discovered, the last in generous quantities. Important botanical, mineral and geological collections were made and many physical observations taken. The coast-line and adjacent sea were surveyed and three new islands discovered, one of them (Possiet) being quite large. In 1895 Dr. Chernyskef examined geologically Nova Zembla along the west coast, from Matoschin Schar to Nameless Bay, and also the interior in his journey from Karmakuly across to Kara Sea.

Between 1885 and 1894 the new Siberian Islands were thoroughly explored by expeditions under the auspices of the Imperial Russian Geographical Society. In 1885 Dr. A. Bunge and Baron E. von Toll visited Jana Land, Siberia. Their most important work was the discovery, in April, 1886, at Bo-Urjak, $70^{\circ} 3' N.$ on Dodomo River, of a mammoth skeleton covered with moss, its bones intermixed with birds' feathers, grass yet green, and other surroundings which indicated a not very remote period. That summer, Toll and Bunge extended their journey to the new Siberian group with eight men. Bunge made Great Liakoff Island the base of his operations. Toll established his headquarters at Kotelnoi, visited Nova Sibir in 23 days, and later explored other islands. In a journey of 40 days he skirted the entire coast of Kotelnoi, and in August from its northwest hills saw the reputed Sannikof Land of 1811. Fortunately the weather was clear, and there were distinctly visible four lofty mountain-peaks which dotted the horizon from 14° to 18° west of north. Toll was able to note that they were

united by a foreland of unbroken continuity, thus indicating a somewhat extensive land. Meanwhile, Bunge was fossil-hunting on Great Liakoff, where he obtained great quantities of fossiliferous remains of the mammoth, rhinoceros, deer, horse, musk-ox, and two new species of the ox family. Toll states that the base of the low-lying parts of Great Liakoff is solid ice, covered by various strata of mud and clay, in which alone the remains of the mammoth and other extinct animals are found. He attributes the extirpation of the mammoth, rhinoceros and other animals constituting the rich fauna of the glacial period to the sinking of the coast, which gradually restricted the land area that furnished nutrition until the animals perished at the very edge of the ice-masses. Baron von Toll in 1893 made a fruitless effort to discover a well-preserved mammoth reported as existing in the Jana region. Scientifically the journey was fruitful in physical observations and rich collections, which were made under such conditions as to fully convince Toll that in the mammoth period the northern limit of timber extended to 74° N., nearly two hundred miles northward of its present limit. During his journey Toll, with Lieutenant Shileiko, laid down two provision depots on the west coast of Kotelnoi, in $75^{\circ} 37'$ N., trusting that they might prove useful for Nansen should he be obliged to retreat to the Siberian coast. Returning, Toll took a direct route from Sviatoi Noss to Dudinka on the Lena, and crossed with reindeer the *tundras*, which were thought to be impassable.

Dr. F. Boas, an American, in 1883-84 explored Baffin Land between Labrador and Lancaster Sound, clearing up the geography of this region and adding most important ethnographic data regarding the Central Eskimo.

The Wellman expedition (1894) ended in the sinking of the *Ragnvald Jarl*, at Walden Island, north of Spitzbergen. Of Nansen's effort to drift across the North Pole in the *Fram*, hoping to emerge between Iceland and Spitzbergen, it was learned that he had passed into the ice of Kara Sea in 1893. On the 13th of August, 1896, he reached Vardö, Norway, having been picked up by the relief steamer *Windward* at Franz Josef Land, where he had passed the previous winter. In March, 1895, he left the *Fram*, which, drifting subsequently to the north of Spitzbergen, safely reached Norway at $86^{\circ} 14'$ N. latitude. See also NANSEN and JACKSON, in these Supplements; and POLAR REGIONS, Vol. XIX, pp. 315-330.

A. W. GREELY.

POLARIZATION. See AURORA, Vol. III, pp. 92, 93; LIGHT, Vol. XIV, p. 610; and WAVE THEORY, Vol. XXIV, pp. 445-447.

POLE, WILLIAM, an English actor, better known by his stage-name, "William Poel"; born in July, 1852. He made his first appearance on the stage at the Royal Theatre, Bristol, in 1876. He made a special study of Shakespeare, and in 1881, with Dr. Furnivall, produced *Hamlet* with Elizabethan costumes, and without scenery, in St. George's Hall, London. In 1887 he became the instructor of the London Shakespeare Reading Society, which, in 1893, played

Shakespeare's *Measure for Measure* under his direction at the Royalty, the stage-setting, costumes, and even the dress, of the spectators being in imitation of the Elizabethan. Mr. Poel holds the theory that Shakespeare's dramas are weakened by the use of modern scenery. He dramatized Baring-Gould's *Mehalah* and Howell's *Foregone Conclusion*, the play from Howell's novel bearing the name *Priest and Painter*.

POLE, WILLIAM, an English civil engineer; born in Birmingham in 1814. In 1844 he was appointed professor of civil-engineering in Elphinstone College, Bombay; from 1859 to 1867 was professor in University College, London; in 1871 was appointed consulting-engineer for the imperial railroads of Japan, and upon his retirement from the post in 1883 was honored by the Mikado with the decoration of the third degree of the Imperial Order of the Rising Sun. He also made a study of music, taking the degree of bachelor in 1860, and of doctor of music in 1867, at Oxford. He was made a fellow of the royal societies of Edinburgh and London. Among his works are *The Life of Sir William Fairbairn* (1877); *The Life of Sir William Siemens* (1888); *The Story of Mozart's Requiem* (1879); and *The Philosophy of Music* (1879).

POLEMIC PERIOD. See DOGMATIC, Vol. VII, pp. 339, 340.

POLEMONIACEÆ. See PHLOX, Vol. XVIII, p. 798.

POLE-RAILWAY. This form of railway is generally regarded as entirely primitive. There are, however, three in the province of Nova Scotia, built within a few years, and one of them is 13 miles long. They are used principally in bringing silica down from the mountains to shipping-ports. The cost of these roads, over fairly level ground, is only \$75 to \$250 per mile. The principal Nova Scotia road is built of spruce poles, selected so that the small end is not less than nine inches in diameter. They are laid down and bedded in the ground, without cross-ties as a rule, the ends being notched into each other to keep them in place, and the upper side trimmed with adzes. For curves, short selected logs are utilized. The wheels of the locomotive and cars are made with a large concave surface, that overcomes minor variations in accuracy of track. Roads have also been built with a square scantling spiked to the top of the logs, so that ordinary flanged car-wheels could be used. In a lumber region, where the poles for the track and the wood fuel for the locomotive cost nothing but the cutting, such roads may be operated to advantage.

POLEVOI, NICHOLAS ALEXEVITCH (1796-1846). See RUSSIA, Vol. XXI, p. 108.

POLIANTHES. See TUBEROSE, Vol. XXIII, p. 602.

POLISHING MACHINERY. Devices for polishing necessarily vary greatly with the nature of the material treated. For stone and marble a felt-covered disk of wood is commonly used, being mounted on a swinging framework designed to give the required pressure and to allow rotation of the disk by means of connecting pulleys. Some form of powder—as chalk or whit-

ing, or tripoli, or pumice—is ordinarily used to facilitate the work. For leather-polishing, a machine carrying a hardwood slicker is used. For metal-work, emery-wheels of varying degrees of fineness are employed. Coarse, common work is cleaned and polished in a polishing-cask or tumbling-barrel, where it is subjected to friction, often with the introduction of some polishing-powder. Lapidaries use a specially smooth wheel of metal, wood, etc., according to the nature of the work. Gunpowder is tumbled about in a barrel with graphite to glaze it. Dentists use a small disk, rotated by a drill-stock or the like, for polishing teeth or fillings. Bookbinders make use of an iron tool for polishing book-covers by pressure.

POLISH LANGUAGE. See SLAVS, Vol. XXII, p. 150.

POLISH LITERATURE. See POLAND, Vol. XIX, pp. 299-305.

POLITICAL SCIENCE. See PHILOSOPHY, Vol. XVIII, p. 796.

POLITY, ECCLESIASTICAL. See CHRISTIANITY, Vol. V, pp. 699, 700; and ECCLESIASTICAL LAW, Vol. VII, pp. 627, 628.

POLIZIANO. See POLITIAN, Vol. XIX, p. 345.

POLK, LEONIDAS, an American clergyman and soldier; born in Raleigh, North Carolina, April 10, 1806. He graduated at West Point; became a minister of the Protestant Episcopal Church; was missionary bishop in the West and Southwest; bishop of Louisiana in 1841; became a major-general in the Confederate army in 1861; took part in the battle of Shiloh; in the fall of 1862 was promoted to rank of lieutenant-general and put in command of the armies of Kentucky and Mississippi; relieved of his command after the battle of Chickamauga on the charge of having disobeyed his superior's orders; given another command in December, 1863, and was killed by an exploding Union shell on Pine Mountain, June 14, 1864.

POLLAIUOLO, ANTONIO (1443-96), a Florentine painter. See SCHOOLS OF PAINTING, Vol. XXI, p. 435.

POLLARD EDWARD ALBERT, an American journalist; born in Nelson County, Virginia, Feb. 27, 1828. He graduated at the University of Virginia, studied law at William and Mary College, and in Baltimore, and then emigrated to California, where, in 1855, he became a journalist. He traveled in Mexico and Nicaragua, returned to the East, and then made a trip to Europe, China and Japan. During President Buchanan's administration he was clerk of the Judiciary Committee in the House of Representatives, and afterward began the study of theology. From 1861 to 1867 he was the editor of the *Richmond Examiner*, and in 1867 established the *Southern Opinion*, which he edited for two years. Before and during the war he was a strong advocate of secession, and, having been captured on his way to England toward the end of the war, was confined by the United States authorities for eight months.

The last part of his life was spent in New York and Brooklyn, where he engaged in literary work. Among his books are *Black Diamonds Gathered in the Darky Homes of the South* (1859); *Southern History of the War* (1862-64); *Lee and His Lieutenants* (1867); *Life of Jefferson Davis* (1869); and *The Virginia Tourist* (1870). He died Dec. 12, 1872.—MARIE ANTOINETTE NATHALIE GRANIER-DOWELL, his wife; born in Virginia; was first the wife of James R. Dowell, but during the Civil War left him on account of political differences; made her way through the Union lines and finally reached Richmond, where she met and married Pollard. After his death she became a public speaker, and canvassed the state of California for the Democratic party in 1876. She also lectured on temperance and the Chinese question.—HENRY RIVES, his brother; born in Nelson County, Virginia, Aug. 29, 1833; was educated at the University of Virginia; employed in Leavenworth, Kansas, in journalistic work and in the Post-Office Department in Washington; associated with his brother on the *Examiner* and *Southern Opinion*. He was killed Nov. 24, 1868, by James Grant, because of an article he had published about the latter.

POLLEN. See BOTANY, Vol. IV, pp. 138-140.

POLLEN, JOHN HUNGERFORD, an English artist; born in 1820; was educated at Oxford, and was elected to a fellowship of Merton, where he painted the college chapel. He studied painting in Rome; was appointed professor of fine arts in the Catholic University of Dublin by Cardinal Newman; built and painted the church in Stephen's Green. He contributed to periodicals on subjects connected with the fine arts, and was Cantor lecturer of the Society of Arts in 1885. Mr. Pollen was corresponding member of the Royal Academy of Madrid, the Archæological Society of Belgium and other learned bodies; and published *Ancient and Modern Furniture and Woodwork*; the *Trajan Column*; and contributed the articles on, CARVING, FILIGREE and FURNITURE in this ENCYCLOPEDIA.

POLLOCK, SIR FREDERICK, an English lawyer; born in London, Sept. 23, 1783; was Attorney-General under Sir Robert Peel, and became Chief Baron of the Exchequer and Privy Councillor in 1844; in 1866 retired with a baronetcy, and died Aug. 23, 1870.—SIR CHARLES EDWARD, an English jurist, son of Sir Frederick; born Oct. 21, 1823, and called to the bar of the Inner Temple in 1847. He was appointed a baron of the Exchequer in 1873, and knighted in the same year. He wrote *Law of Merchant Shipping*, with F. P. Maude (1884), and *Treatise on the Power of Courts of Common Law to Compel the Production of Documents for Inspection*.—SIR FREDERICK, nephew of Sir Charles Edward, writer on law; born Dec. 10, 1845, educated at Cambridge, and called to the bar in 1871; was professor of jurisprudence at University College, London, (1882-83); in 1883 became professor of jurisprudence in Oxford from 1884 to 1891; was professor of law in the Inns of Court; lecturer in the

University of Calcutta (1893-94); became editor of the *Law Quarterly Review* in 1885, and of the *Law Reports* (1895). He published treatises on the law of *Contracts* (1875); *Partnership* (1877); *Torts* (1887); *A Life of Spinoza* (1880); *Essays on Jurisprudence and Ethics* (1892) and contributed the article on TORT to this *ENCYCLOPEDIA*.—WALTER HERRIES, a journalist, brother of the latter; born Feb. 21, 1850, in London; educated at Eton, and Trinity College, Cambridge, and called to the bar in 1874. He engaged in literary pursuits, and from time to time delivered lectures before the Royal Institution upon historical and literary subjects; in 1884 he became editor of the *Saturday Review*, which place he retained until 1894. He published *Lectures on French Poets* (1879); *Songs and Rhymes* (1882); *The Picture's Secret*, a novel (1883); *Old and New*, a collection of verse; and *A Nine Men's Morrice*, a volume of fantastic stories. He contributed the articles on MUSSET and THACKERAY to this *ENCYCLOPEDIA*.

POLO, a village of Ogle County, central northern Illinois, 13 miles N. of Dixon, on the Illinois Central and the Chicago, Burlington and Northern railroads. It manufactures harvesters and buggies, and is an important trade center, especially for cattle and hogs. It has a public library, national banks and papers. Population 1890, 1,828.

POLYANDRY. See FAMILY, Vol. IX, pp. 18-20.

POLYANTHUS. See HORTICULTURE, Vol. XII, p. 259.

POLYCENTRIDÆ. See ICHTHYOLOGY, Vol. XII, p. 689.

POLYCHÆTÆ. See ANNELIDA, Vol. II, pp. 65-68.

POLYEMBRYONY, in botany, strictly refers to the production of more than one embryo by a single fertilized sexual cell. Ordinarily, however, it is applied to all cases in which more than one embryo is found in a seed,—a fact repeatedly observed in orange seeds.

POLYGAMY. See MORMONS, Vol. XVI, pp. 826-828.

POLYGON. See GEOMETRY, Vol. X, pp. 381, 382.

POLYGONUM, a large genus of plants, chiefly weeds, distributed everywhere. The smartweeds and knotweeds are among the common species, while the more showy ones, such as *P. orientale*, or prince's feathers, are cultivated for ornament. The East Indian "giant clover" (*P. Sachalinense*) has been introduced into the United States from Russia as a forage plant. It grows very luxuriantly in regions formerly thought unfit for grazing purposes, producing an extraordinary amount of foliage, attaining a height of 8 to 12 feet.

POLYGORDIUS. See WORM, Vol. XXIV, pp. 683, 684.

POLYHEDRA. See MENSURATION, Vol. XVI, p. 24.

POLYHYMNIA. See MUSES, Vol. XVII, p. 74.

POLYMERISM. See CHEMISTRY, Vol. V, p. 551.

POLYMORPHISM, in botany, refers to the

fundamental fact in the morphology of plants that a plant assumes at least two different forms during its life-history, giving rise to what is known as ALTERNATION OF GENERATIONS; q.v., in these Supplements.

POLYNEMIDÆ. See ICHTHYOLOGY, Vol. XII, p. 689.

POLYNICES, the son of Œdipus by his own mother, Jocasta, and one of the heroes in the Greek legend of the *Seven Against Thebes*. See ADRASTUS, Vol. I, p. 164.

POLYPHASE CURRENTS. See ELECTRICITY, § 88, in these Supplements.

POLYPHEMUS, one of the mythical Cyclopes of Sicily, the son of Poseidon (Neptune) and the nymph Thoosa. He is represented as a gigantic ogre, having but one eye, and that in the middle of his head, who was without fear of gods or men. He lived in a cave near Mount Etna and kept sheep. He fell in love with the nymph Galatea, and when she chose Acis in preference to him, killed his rival by crushing him under a great rock. Ulysses was shipwrecked on the Sicilian coast near the cave of Polyphemus, and was captured and imprisoned by the monster, who devoured some of his men. Ulysses, however, put out the giant's eye while he was asleep, and escaped, with the remnant of his band, by clinging to the wool on the sheep as they left the cave, when Polyphemus let them out to pasture.

POLYPHONY. See MUSIC, Vol. XVII, p. 86.

POLYPLACOPHORA. See MOLLUSCA, Vol. XVI, p. 641.

POLYPODIACEÆ. See FERNS, Vol. IX, p. 104.

POLYTHEISM. See RELIGIONS, Vol. XX, p. 368.

POMERANUS. See BUGENHAGEN, Vol. IV, p. 445.

POMEROY, a city and the capital of Meigs County, southeastern Ohio, on the Ohio River, 20 miles above Gallipolis, and on the Columbus, Hocking Valley and Toledo railroad. It contains numerous salt-furnaces and coal-mines, and has rolling and rail-mills, flour, saw, planing and woolen-mills, machine and engine works, and other industries. Population 1890, 4,727.

POMEROY, MARK MILLS, commonly called BRICK POMEROY, an American journalist; born in Elmira, New York, Dec. 25, 1833; died in Brooklyn, New York, May 30, 1896. He gained the rudiments of an education in the common schools, and at 17 was apprenticed to the publisher of the *Corning (New York) Journal*; later conducted a paper of his own in Corning, and afterward in Athens, Pennsylvania; from 1857 to 1864 he lived in Wisconsin and published the *La Crosse Democrat*, which came to have a very large circulation; moved to New York in 1868 and founded *Brick Pomeroy's Democrat*, which gained an immense circulation because of its radicalism and sensationalism. He suffered financial loss, and for a time lived in Chicago, but returned to New York in 1875, resumed the editing of his paper and became one of the chief supporters of

"greenbackism." His health soon failed him, and he went to Colorado and there engaged in mining and railroading, but still kept up his connection with several New York radical papers. He published several books, principally on economic subjects; among them, *Sense* (1868); *Nonsense* (1868); *Gold Dust* (1872); *Brick Dust* (1872); *Home Harmonies* (1874); and *Perpetual Money* (1878).

POMEROY, JOHN NORTON, an American writer on jurisprudence; born in Rochester, New York, April 12, 1828. He graduated at Hamilton College, studied law and began practice in Rochester, New York; held a professorship in the University of the City of New York from 1864 to 1865; continued practice until 1878; in that year accepted a call to the chair of law in the University of California, where he remained till his death. Professor Pomeroy edited the *West Coast Reporter* from 1884 to 1885; was the author of treatises on *Municipal Law*; *Constitutional Law of the United States*, used as a text-book at West Point and elsewhere; *Remedies and Remedial Rights*; *Specific Performance of Contract*; *Equity Jurisprudence*; and *Riparian Rights*; and edited Sedgwick's *Statutory and Constitutional Law* (1874); and Archbold's *Criminal Law* (1876). He died Feb. 15, 1885.

POMEROY, SETH, an American patriot and soldier; born in Northampton, Massachusetts, May 20, 1706. He was lieutenant-colonel in 1755, and succeeded Ephraim Williams in command of his regiment after the death of the latter in the Lake George campaign; was delegate to the provincial congress of Massachusetts in 1774-75; fought as a private at Bunker Hill; declined an appointment as senior brigadier-general by the Continental Congress; and headed a large force for the relief of General Washington in 1776; died in Peekskill in the following year.

POMO INDIANS. See INDIANS, Vol. XII, p. 826.

POMOLOGY. See *Fruits*, under HORTICULTURE, Vol. XII, pp. 268-278.

POMONA. See ORKNEY ISLANDS, Vol. XVII, pp. 845-849.

POMONA, a city of Los Angeles County, southern California, 33 miles E. of Los Angeles, on the Southern Pacific railroad. It is in a mining and fruit-raising region. It has planing-mills, pipe-works, a winery and a cannery. Population 1890, 3,634.

POMPANO, a name given to several different fishes. The name properly refers to the genus *Trachynotus*. *T. carolinus* occurs on the Atlantic coast, and large numbers are captured on the Florida coast. On the California coast and in Europe the name is applied to species of *Stromateus*. Several different fishes in the Gulf of Mexico have also have been locally called pompanoes.

POMPEY'S PILLAR. See ALEXANDRIA, Vol. I, p. 495.

PONCA, a village and the capital of Dixon County, northeastern Nebraska, 18 miles W. of Sioux City, Iowa, on the Missouri River, and on the Chicago, St. Paul, Minneapolis and Omaha

railroad. It is in a lumbering and wheat-raising region. Population 1890, 1,009.

PONCA INDIANS. See INDIANS, Vol. XII, p. 832.

PONCE, a town and district. See PORTO RICO, Vol. XIX, p. 533.

PONCE DE LEON, JUAN, a Spanish adventurer; the discoverer of Florida; born at San Servas, Spain, in 1460, was a court page, served against the Moors, and in 1502 sailed with Ovando to Hispaniola and became governor of the eastern part of the island. In 1510 he obtained the governorship of Porto Rico, and had conquered the whole island by 1512, when he was deprived of his post. He then, broken in health, set out on a quest for the fountain of perpetual youth, and on March 27, 1512, discovered Florida, landing a little to the north of where St. Augustine now stands. He secured the appointment of governor *pro tempore* of the country, and, after stopping on his way back to drive the Caribs out of Porto Rico, he returned in 1521 to conquer his new subjects; in this, however, he failed and lost nearly all his followers. He retired to Cuba, and died there, in July, from the wound of a poisoned arrow. His remains and a monument are in San Juan de Porto Rico.

PONCHIELLI, AMILCARE, an Italian opera composer; born in Paderno Fasolaro, Cremona, Aug. 31, 1834; studied at the Conservatory of Milan in 1843-54; in 1856 his first opera, *I Promessi Sposi*, was produced at Cremona; later he wrote *La Savojarida* (1861); *Roderico* (1864); and *La Stella del Monte* (1867). In 1872, his first work, rewritten for the purpose, was produced at La Scala, Milan, and won him immediate renown. His later works are *Le Due Gemelle*, a ballet (1873); *Il Parlatore Eterno* (1873); *I Lituani* (1874); *Gioconda* (1876); *Marion Delorme* (1885), and other operas, besides a cantata performed at the reception of the remains of Donizetti and Simone Mayr at Bergamo in 1875. He died in Milan, Jan. 16, 1886. At the time of his death he was esteemed next to Verdi by the Italians as a composer of opera.

PONDWEED, the common name of species of *Potamogeton*, a genus of plants having perfect flowers in a spike. The perianth has four scales, four opposite sessile anthers, four pistils which become four small nuts, and a curved embryo. The species abound chiefly in the rivers, lakes and ditches of the United States and Europe. They often present a beautiful appearance in clear streams and ponds.

PONS VARIOLI. See ANATOMY, Vol. I, p. 871.

PONTA DELGADA, a town. See AZORES, Vol. III, p. 171; and DELGADA, in these Supplements.

PONT-À-MOUSSON, a town in the department of Meurthe-et-Moselle, northwestern France, on the river Moselle and 14 miles N. of Nancy. It has blast-furnaces, iron and locksmiths' shops, and manufactures plush and velvet; was the seat of the University of Lorraine from 1572 to 1768, and was also the birthplace of Margaret of Anjou,

wife of Henry VI of England, and Marshal Duroc, the friend and favorite of Napoleon I. Population, 9,904.

PONTCHARTRAIN, LAKE, a body of water in southeastern Louisiana, five miles W. of the Mississippi, at New Orleans. It is 40 miles long and 25 wide, and connects with New Orleans by two canals. It communicates with Mississippi Sound and Lake Borgne by the passes of Chef Menteur and Rigolets. On its shores are many summer resorts, its northern bank being high and healthful. Lumber, firewood and brick, manufactured in the neighborhood, are extensively transported through the lake.

PONT DU GARD. See **AQUEDUCT**, Vol. II, p. 220, plate.

PONTIAC, a city and the capital of Livingston County, northeastern central Illinois, 35 miles N.W. of Bloomington, on the Vermilion River, and on the Chicago and Alton, the Illinois Central and the Wabash railroads. It is the seat of a state reform school, and is engaged in milling, mining, iron-casting, shoe and straw paper manufacturing, and general trade. Population 1890, 2,784.

PONTIAC, a city and the capital of Oakland County, southern Michigan, on Clinton River, surrounded by many small and beautiful lakes, 26 miles by rail N.W. of Detroit, on Pontiac, Oxford and Northern, the Detroit, Grand Haven and Milwaukee and the Grand Trunk railroads. Oak, ash, elm and beech forests lie about the city; the soil is fertile; corn, oats, wool, etc., are produced. It contains the State Reform School and the State Insane Asylum, which cost nearly five hundred thousand dollars, and has flour and planing mills, foundries and brick-yards. Population 1890, 6,243; 1895, 7,276.

PONTIAC, an American Indian, chief of the Ottawas, born about 1720. After the alliance was closed with the Pottawottomies and Ojibways he became chief of the three tribes. He made a treaty with the French; in 1746 he defended Detroit from an attack by other tribes, and was said to have led his warriors at Braddock's defeat in 1755. After the French had surrendered Canada, his hatred of the English prompted him to organize a conspiracy among the Indian tribes, with a view to the extermination of "those dogs dressed in red." The 7th of May, 1763, was appointed for the attack, which in eight cases was successful, and the garrisons were massacred; but at Detroit, where Pontiac led in person, the commander was forewarned and a five months' siege ensued. Peace was made in 1766. Pontiac himself was murdered in 1769 by a Kaskaskia Indian, at Cahokia, Illinois, opposite St. Louis.

PONTINE MARSHES. See **CAMPAGNA**, Vol. IV, p. 751.

PONTUS, EUXINUS, the ancient name for the **BLACK SEA**; q.v., Vol. III, 795-799.

POOL. (For a general account and history, see **BILLIARDS**, Vol. III, p. 677.) There are an almost endless number of games to be classed within this category, but the principal ones are pyramid,

15-ball and continuous pool. In 15-ball pool the balls are numbered from 1 to 15, and it is the aim of the players, when two are engaged, to secure an aggregate of 61. The sum total of all the numbers on the 15 balls amounts to 120, and the player first obtaining the number (61) which is more than half of the total wins the game. The game of American pyramid pool as played in championship matches differs from 15-ball pool quite materially. The rules governing pyramid pool recognize the numbers on the balls solely as a means of identification when the player called his shot. Instead of a player being required to hole balls bearing numbers sufficient to give him a certain total of points, it was simply necessary for him to pocket a majority of balls, regardless of their numbers, in order to win. Thus, if two men were playing pyramid pool, the man who succeeded in first pocketing 8 out of the 15 balls comprising the pyramid would be declared the winner. This style has, however, been amended by what is known as continuous pool, which is now the prevailing system of play in all professional contests for championship honors. The rules of continuous pool provide that the balls shall be numbered from 1 to 15, but the scoring of the game is continued until all the balls in each frame have been pocketed. The game may consist of any number of balls, or points up, which may be agreed upon. Each ball pocketed scores one point for the player, and the game is usually scored upon a string of buttons over the table, as in regular billiards. Penalties are paid through deducting points from the offending player's score, or string of buttons, instead of forfeiting a ball to the table, as in regular pyramid pool. There have been several interpolations in the rules governing continuous pool during the past few years. In a match for the championship of the world, between Alfred de Oro and William H. Clearwater, at Pittsburg, Pennsylvania, May 7, 8, and 9, 1896, which was won by De Oro, the existing rules provided that a player must call a ball on the break or opening shot at the pyramid, and a ball that was holed in any hole except the one named was spotted. The pockets of the table (which is the regulation 5 by 10 feet) are now numbered from 1 to 6, and the player, when about to shoot, designates both the ball and the pocket, and the ball must be holed as specified, or the player does not count.

The game of pin-pool is also popular, and occupies a prominent position in the history of pool-playing in America. There have been many notable encounters at this game, and it still ranks very high among billiard and pool players all over the country. It is played with two white balls and one red, together with five small wooden pins, which are set up in the middle of the table, diamond-fashion, each pin having a value (from 1 to 5) to accord with the position it occupies. The one nearest the string-line is No. 1, that to the right of it is No. 2, to the left is No. 3, the pin farthest from the string-line is No. 4, and

the central pin is No. 5. The object of the player is to knock down (after striking an object-ball with his cue-ball) as many pins as will count 31, when the number on a small ball, which he received before the game starts, is added to their aggregate. The numbers on these small balls are known only to the individual players who possess them, and are not disclosed to opposing players. Whoever first gets 31 points wins the pool. See also BILLIARDS, in these Supplements.

BENJ. A. MACDONALD.

POOL, MARIA LOUISE, an American authoress; born in Rockland, Massachusetts, Aug. 20, 1845; the daughter of Elias Pool, a manufacturer of that place, and of stanch Puritan stock. She received her education in the East Abington schools, with the view of becoming a teacher, but she gave up this career after one year. She spent several seasons in the South and in the Carolina mountains, but it is in her own New England that she found her truest suggestions and inspirations. After 1885 she began to write sketches for the New York journals. Her *Vacation in a Buggy*, published in 1887, gives her ideal of a vacation,—a companion (of her own kind), a dog, a Texan pony and a long day amid country byways. Her other books are *Tenting at Stony Beach* (1888); *Rowney in Boston* (1892); *Mrs. Keats Bradford* (1892); *Dally* (1893); *Katherine North* (1893); *The Two Salomes* (1893); *Out of Step* (1894); *Against Human Nature* (1895).

POOLE, JOHN, an English humorist; born in 1792. He wrote a number of sketches and farces which were full of a racy humor, resembling a little that of Sterne. Among the best known are *Paul Pry*; *Comic Sketch Book*; *Little Pedlington and the Pedlingtonians*, and *Christmas Festivities*. He died Feb. 5, 1879.

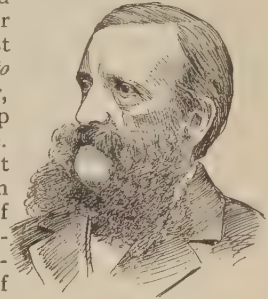
POOLE, REGINALD LANE, an English historian, son of R. S. Poole; born in London in 1856; was educated at Balliol College, Oxford, graduating in 1878. He was chosen to fill the chair of modern history at Jesus College in 1886. He published *History of the Huguenots of the Dispersion at the Recall of the Edict of Nantes* (1880); *Sebastian Bach*, in the Great Musician Series (1882); *History of Mediæval Thought in the Departments of Theology and Ecclesiastical Politics* (1884); and translated Land's *Principles of Hebrew Grammar* (1876). He contributed the article on WYCLIFFE to this ENCYCLOPÆDIA.

POOLE, REGINALD STUART, an English Egyptologist, uncle of Stanley Lane-Poole; born in London, Feb. 27, 1832. He was educated, privately, by his uncle, Edward Lane (q.v., Vol. XIV, p. 282), in Egypt, and there, at the age of 17, wrote papers on Egyptian chronology, which were afterward published under the title *Hora Egyptiaca* (1851). He was given a place in the department of antiquities in the British Museum in 1852, in 1866 appointed assistant keeper of coins, and in 1870 assumed entire control of that department; in 1885 was chosen professor of archæology at University College, London. He published 35

volumes of catalogues of coins, and wrote *Cities of Egypt* (1882); *Lectures on Art* (1883); and the articles on EGYPT, HIEROGLYPHICS, and NUMISMATICS, in this ENCYCLOPÆDIA. He died in Egypt Feb. 8, 1895.

POOLE, STANLEY LANE. See LANE-POOLE, STANLEY, in these Supplements.

POOLE, WILLIAM FREDERICK, an American librarian; born Dec. 24, 1821, in Salem, Massachusetts. He was educated at Yale, and in his junior year published the first edition of his *Index to Periodical Literature*, which has been kept up to date from time to time. He was chosen assistant librarian of the Boston Athenæum in 1851; chief librarian in 1856; librarian of the Cincinnati Public Library (1869–74); of the Chicago Public Library (1874–87); and of the Newberry Library at Chicago from the last-named year till his death. He was president of the American Historical Association and of the American Library Association, and in 1874–75 edited, in Chicago, the *Owl*; published *Battle of Dictionaries*; *The Orthographical Hobgoblin*; *The Mather Papers*; and *Salem Witchcraft*. He died March 4, 1894.



W. F. POOLE.

POOLS AND POOLING. See RAILROAD, in these Supplements.

POORE, BENJAMIN PERLEY, an American journalist; born in Newburyport, Massachusetts, Nov. 2, 1820; was apprenticed to a printer, and from 1838 to 1840 edited the *Southern Whig* in Atlanta, Georgia; visited Europe (1841–48) as attaché of the American legation at Brussels, and was historical agent of the state of Massachusetts, for which he collected ten folio volumes of historical matter from the French archives, and also correspondent for the Boston *Atlas*; became editor and proprietor of the *Sunday Sentinel* in 1851; in 1854, Washington correspondent for the Boston *Journal*, and while there served as clerk on the Senate committee for printing records, and as secretary of the United States Agricultural Society; in 1867 became editor of the *Congressional Directory*. Among his numerous works are *Rise and Fall of Louis Philippe* (1848); *Campaign Life of Zachary Taylor* (1848), of which 800,000 copies were sold; *Conspiracy Trial for the Murder of Abraham Lincoln* (1865); *Federal and State Characters* (1877); and *Reminiscences of Sixty Years in the National Metropolis* (1886). He compiled for the government *Catalogue of Government Publications of the United States, 1774–1881* (1885). He died in Washington, District of Columbia, May 30, 1887.

POOR—LAWS. "Every person who is old, lame, blind, sick, decrepit, impotent, or in any other way disabled or enfeebled so as to be unable by his work to maintain himself, shall be

maintained by the county or town in which he may be." This was essentially the provision of the English poor-law adopted in the time of Elizabeth, in the hope of thus putting an end to the beggary which flogging and drowning and hanging and burning were not able to diminish, and this is essentially the basis of our poor-law system in the different states. Failing to banish the beggar by punishment, our ancestors went to the other extreme of feeding the beggar, of providing a shelter for him, and punishing those who would not pay for his support. This was the method of dealing with beggary which the colonies adopted from the mother country, and the principle which this method implied has found expression in the "poorhouse," fashioned after the English workhouse.

In early times the poorhouse was the common receptacle for all the unfortunate and indolent, from the fatherless infant to the vicious and idle beggar. The insane, both acute and chronic; the idiotic and feeble-minded; the deaf and dumb; the blind; the sick, of whatever disease; the unfortunate but respectable poor, the tramp, the dissolute—all classes of dependents and defectives, and even delinquents, were housed, and often without classification, in this one house of hopelessness and despair; for there could be little hope of physical recovery, or of the restoration of manhood, in such a place. The poorhouse was looked upon as merely a place of shelter or of custody; and in many states, especially in those less thickly settled, these conditions exist to-day.

But with increased knowledge of the means of treating disease, and with the growing appreciation of the need and value of preventive work, has come a specialization in the care and treatment of the various classes once sheltered under this common roof. One class after another has been provided for outside of the poorhouse, either by public or private agency, and, as a result, in many communities the houses which were once veritable bedlams have become quiet homes for the old who are left without support, and for the hopelessly sick and the utterly helpless defectives.

The insane have been, as a rule, the first class for which special provision has been made. Once looked upon as persons possessed of evil spirits, or as objects of some supernatural visitation, they were imprisoned or tortured, or, at best, left without the care and keeping necessary for the restoration of their reason. But as people came to understand that insanity was a physical disease, responsive to treatment as other bodily diseases, those who languished in poorhouses without care were placed in asylums,—institutions in which the custodial character was made prominent, but where treatment was afforded for the acute cases. To-day there is, in some of the states, practically no line of hopelessness, and all the insane are cared for in hospitals,—institutions in which treatment is the first object. In 1889 a law was passed by the New York legislature providing for the removal of all the pauper and in-

digent insane from poorhouses of the state to hospitals designed especially for their care and treatment, and in other states similar provision has been made.

This is only an illustration of what has been done for many other classes of the diseased, and for the defective. Institutions have been provided by the state for the education and the training of the blind and the deaf and dumb; for the custody of feeble-minded women, who in former times remained in the community, or perhaps were sent to the poorhouse, and permitted to transmit to future generations the defect or the taint which a wise care might have cut off with them; for the reformation of vicious and dissolute women, doomed, under the old system, to lives of vice and danger to the community; for the training of feeble-minded and idiotic children; and for the treatment and care of epileptics. The municipality and the private society have assisted the state in this specializing process, particularly in providing for the sick, for the relief of the poor in their homes, for the employment of the blind and for the education of neglected children.

There is one other class, once housed in the county almshouse, and now separately provided for in many states, of which special mention should be made—the dependent children. Allowed to associate with the adult paupers of all classes, as they once were, many of them grew up to be paupers themselves, or worthless members of society. In many states, therefore, laws have been passed prohibiting the detention of children in poorhouses after the age of two years. In some instances the public looks after these children in children's homes or in state schools, while in others this provision has been made in the most part by private charity. In some states, particularly New York, the provision for the care of children in special institutions has given rise to an evil almost as great as that which their creation was intended to remove,—less serious in character, perhaps, but of wider reach. The generous provision of public and of private charity for the care of children has, in the first place, led many parents to relieve themselves of the responsibility and expense of the care of their offspring during the years when the expense and care would be greatest, and in the second place, children brought up in immense institutions are deprived of the individual treatment and the care which a child should have. As a result of this, there has been noticeable lately a strong movement in favor of family homes for dependent children. Private societies have been organized for finding homes for children and for looking after them in the homes found, and in many states the public agents do more or less of the same work.

This specialization of relief has been in the direction of the prevention of pauperism; that is, of preventing permanent dependence upon the public. Many insane, placed in hospitals, have been restored to society in sound mind; the sick, once left to die in poorhouses, under special treat-

ment have been enabled again to support themselves; the blind and the deaf and the dumb have been taught trades; the feeble-minded and idiotic have been trained to self-help, and in some cases to self-support; the children, doomed by the association of the poorhouse to worthless lives, have been placed in homes to be reared as respectable, law-abiding citizens.

In recent poor-law legislation there is a noticeable movement in the direction of increased centralization of control. The relief of counties and towns has been brought under the supervision, and to an extent under the control, of the state, and certain private agencies have been made subject to the same authority. State boards of charities have been organized in many states, and in some there are commissions to look after certain classes of the dependent and defective. This movement is obliging all the communities in the states where the supervision is close and exacting to approach the highest standard of care and treatment, and is affording a practical medium for the transmission of improved methods. There is no national board with executive powers, but there is a national body of volunteers, who meet yearly and discuss questions relating to charities and correction. Public relief outside of institutions—that is, outdoor relief—has been found to be injurious in many communities, because it is not sufficiently discriminating, and because, no odium attaching to the recipient of such relief, it tends to invite the need which compels relief. This has led to a wide advocacy of the abolition of this kind of relief, and to its abandonment in some communities and reduction in others. In Brooklyn, for example, several years ago, outside relief, amounting to more than \$100,000 a year, was entirely cut off in midwinter, and that, too, without increasing the applications for indoor relief, or causing any apparent distress. It has been entirely abolished in Philadelphia, and practically abolished in New York City. A great deal is given in small towns in outdoor relief, but the tendency seems to be to restrict this form of relief and to substitute for it indoor relief or private outdoor relief. Baron von Reitzenstein, a most distinguished student of this subject of poor-relief, in a paper read at the International Congress of Charities and Correction at Chicago in 1893, said: "Upon conviction of the evils by which the administration of outdoor relief of the poor through the public officers is hindered, and which are considerably increased through accompanying unsystematic private benevolence, rests that new movement which is gradually winning more ground in England, and thence has been transferred to America. It seeks to insure an individualizing outside care of the poor by the private organization, and to limit the public care as much as possible to the institution."

While state legislation with respect to the relief of the poor does not materially change except in making provision for the separate care of special classes of the poorhouse population, or in preventing the retention of certain classes in poor-

houses, the tendency is, to-day, to give only indoor relief, or to employ the assistance of private agencies in giving outdoor relief. This tendency has developed concurrently with the growth of charity organization societies and with the spread of education in the matter of giving relief.

The poorhouse population decreased rather than increased in the decade 1880-90. There is no reliable estimate of the number of recipients of public outdoor relief. The number of poorhouse inmates in 1890 was 73,045, of whom a large portion were in the county poorhouses. There are county poorhouses in most of the states; in four there are only township poorhouses; in a few, both county and township.

The average age of poorhouse inmates is about fifty years, and one per cent of all persons sixty-five years of age or over are in poorhouses and one per cent in other benevolent institutions. The ratio of the foreign-born in poorhouses is three and two third times as great as of the native-born.

Besides the inmates of poorhouses there were, June 1, 1890, 111,910 beneficiaries in the benevolent institutions of the United States, of whom about one third received whole or partial support from the public. It is estimated that two thirds of the institutional relief given in this country is at the expense of the state or municipal treasuries.

With the wider knowledge of the evils of indiscriminate giving, with the earnest and increasing efforts that are being made to remove the causes of pauperism and crime, exerted through such agencies as public reformatories, houses of refuge, institutions for the training of defectives, etc., and such private agencies as charity organization societies and volunteer associations organized to co-operate with and to assist poor-law officials and superintendents of public institutions, the prospect of a better and more efficient administration of the poor-laws seems bright. There is, however, this hindrance: the poor-masters and superintendents of the poor are generally selected, not because of any special fitness for the office, but for political reasons. When civil-service reform reaches the poor-law officers the states will have a better administration of existing laws, and in time better poor-laws. See also POOR-LAWS, Vol. XIX, pp. 462-468; and CHARITY ORGANIZATION, in these Supplements.

JOHN H. FINLEY.

POPE, JOHN, an American soldier; born in Louisville, Kentucky, March 16, 1822. He was graduated at West Point in 1842 and appointed second lieutenant of topographical engineers; served in Florida (1842-44), in the survey of the northeast boundary line, and in the Mexican War, gaining the brevets of first lieutenant and captain at Monterey and Buena Vista; in 1849 conducted an exploring expedition to the Red River of the North, and for the following twelve years was employed in topographical surveys in New Mexico, and for a Pacific railroad near the 32d parallel, receiving the commission

of captain in 1856. At the outbreak of the Civil War he was made brigadier-general of volunteers



GENERAL JOHN POPE.

and put in charge of the district of Missouri, where he defeated General Sterling Price, Dec. 18, 1861, at Blackwater; was put in command of the land force, co-operating with Admiral Foote on the Mississippi, and after the capture of Island No. 10 was made major-general of volunteers; commanded the army of the Mississippi in the operations against Corinth in April and May, 1862, and in June of that year was put in command of the army of Virginia; after an unsuccessful campaign in the northern part of the state against Generals Jackson and Lee, was relieved of his command at his own request, and given the Department of the Northeast; in 1865 was transferred to the Division of the Missouri; in 1867-68 commanded the third district organized under the Reconstruction Act, comprising the eastern Southern states; in 1868-70 the Department of the Lakes; in 1870-84, of the Missouri; from 1884 until 1886, when he resigned, the Department of the Pacific; was made major-general in the United States army in 1882. General Pope claimed his failure in Virginia was due to the disobedience of General Fitz-John Porter, and the latter was court-martialed and expelled from the army in 1863, but was reinstated in 1886. General Pope published *Explorations from the Red River to the Rio Grande and Campaign of Virginia of July and August, 1862* (1865). He died Sept. 23, 1892.

POPHAM, SIR JOHN, an English jurist; born in Wellington, Somersetshire, in 1531; was educated at Balliol College, Oxford; studied law at the Middle Temple and became a sergeant in 1571; was speaker of the House of Commons (1581); Attorney-General (1585); Chief Justice (1592-1607). He presided at the trials of Sir Walter Raleigh, Guy Fawkes and other notable men. He died June 10, 1607.

POPISH PLOT. See OATES, Vol. XVII, p. 697.

POPLAR BLUFF, a village and the capital of Butler County, southeastern Missouri, 166 miles S. of St. Louis, on the St. Louis, Iron Mountain and Southern railroad, and on the David River. It is an important shipping-point of a very fertile and well-timbered region. It has stockyards, and a large stove factory employing eight hundred hands. It is the seat of a seminary. Population 1890, 2,187.

POPPY, the common name of species of the family *Papaveraceæ* in general, but specially applied to species of *Papaver*, the most famous of which is *P. somniferum*, the opium poppy. Many of the species are cultivated for ornament.

PORCELAIN. See POTTERY AND PORCELAIN, Vol. XIX, pp. 600-643; and CERAMIC ART and

POTTERY INDUSTRY IN THE UNITED STATES, in these Supplements.

PORCH. See ARCHITECTURE, Vol. II, p. 470.

PORCHER, FRANCIS PEYRE, an American physician and author; born in St. John's, Berkeley County, South Carolina, Dec. 14, 1825. He graduated at South Carolina College in 1844 and State Medical College in 1847; during the Civil War was in charge of the Confederate hospitals at Norfolk and Petersburg, Virginia; was editor of the *Charleston Medical Journal and Review* (1850-55 and 1873-76); for a long time previous to his death was professor in the South Carolina State Medical College. Among his works are *The Medical Botany of South Carolina* (1849); *The Medicinal, Poisonous and Dietetic Properties of Cryptogamic Plants of the United States* (1854); and *Resources of the Southern Fields and Forests* (1863). He died in Charleston, Nov. 19, 1895.

PORCUPINE ANT-EATER. See ECHIDNA, Vol. VII, p. 628.

PORGY or PORGEE, a popular name locally applied to several fishes. In Europe the *Pagrus vulgaris* is called porgy. Along the Atlantic coast of the United States the name is given to the scup (*Stenotomus argyrops*); q.v., in these Supplements. The name is often confused with that of pogy or menhaden (*Brevoortia tyrannus*). Other fishes have been called porgies. The name is apparently a corruption of *pagrus*, and hence properly belongs to fishes of the genus *Pagrus*.

PORIFERA, a phylum. See ZOÖLOGY, Vol. XXIV, p. 812.

POROGAMY, a name recently applied in botany to cases where the pollen-tube enters the ovule through the micropyle, as distinguished from the few cases in which it enters the ovule in some other way. See CHALAZOLOGY, in these Supplements.

PORPHYROGENITUS. See CONSTANTINE VII, Vol. VI, p. 301.

PORPHYRY, a philosopher. See NEO-PLATONISM, Vol. XVII, pp. 336, 337.

PORSENA, LARS. See ROME, Vol. XX, p. 735.

PORTA, GIACAMO. See ARCHITECTURE, Vol. II, p. 439.

PORTAGE, a city and the capital of Columbia County, central Wisconsin, 30 miles N. of Madison, on the Wisconsin River, the ship-canal connecting it with the Fox River, and on the Chicago, Milwaukee and St. Paul and the Wisconsin Central railroads. It is an important manufacturing town and a center of trade, having grain-elevators, iron-works, a hosiery factory and plow factory. Granite, sandstone and jasper are found in the vicinity. Population 1890, 5,143.

PORTAGE LA PRAIRIE, a town of southern central Manitoba, in Marquette County, 52 miles W. of Winnipeg, on the Canadian Pacific, the Manitoba and North-Western and the Northern Pacific railroads. It is a busy manufacturing and trading center, being in a rich farming country and having flour-mills, grain-elevators, a biscuit factory, paper-mill, and publishing several papers. Population 1891, 3,363.

PORT ARTHUR, a town of western Ontario, on

Thunder Bay, where it is joined by a small river, and on the Canadian Pacific railroad. It also has regular steamboat connection with Owen Sound, on Georgian Bay. It is the seat of extensive lumbering and mining interests, and in the vicinity are large quarries of marble and building-limestone. There are gold and silver mines forty miles southwest of the town. Grain and fish, gold, silver and lumber are shipped. Population 1891, 2,698.

PORT ARTHUR OR LUSHUNKU, a naval station of the province of Shing King, China, about 275 miles E. of Peking, at the southern point of the Liaotung Peninsula, in the Gulf of Pechili. It is the headquarters of the northern fleet of China, and is strongly fortified. It was taken by the Japanese in November, 1894, but at the instance of Russia was returned to China in the treaty of May, 1896. See also COREA, in these Supplements.

PORT BYRON, a village of Cayuga County, central New York, 10 miles N. of Auburn, on the Oswego River, the Erie canal and the New York Central and Hudson River and the West Shore railroads. It contains an academy, and manufactories of paper, shirts and barrels. Population 1890, 1,105.

PORT CARBON, a borough of Schuylkill County, central eastern Pennsylvania, 3 miles E.N.E. of Pottsville, on the Philadelphia and Reading railroad. It is engaged in coal-mining and in the manufacture of iron. Population 1890, 1,976.

PORT CHESTER, a village of Westchester County, southeastern New York, on Long Island Sound, 25 miles N.E. of New York, and on the New York, New Haven and Hartford railroad. It is in a very beautiful and fertile region, and contains an academy and several foundries, stove and iron-bolt factories and mills. Population 1890, 5,274.

PORT CLINTON, a village and the capital of Ottawa County, central northern Ohio, 32 miles E.S.E. of Toledo, at the mouth of Portage River, on Lake Erie, and on the Lake Shore and Michigan Southern railroad. It has a good harbor, and contains several mills, and has fishing, peach and grape raising industries. Population 1890, 2,049.

PORT DEPOSIT, a town of Cecil County, northeastern Maryland, near the mouth of the Susquehanna, four miles N. of Havre de Grace, on the Washington branch of the Pennsylvania railroad. It is an important lumber-shipping and granite-quarrying place. Population 1890, 1,908.

PORT ELIZABETH, a seaport and commercial town in the southeast of Cape Colony, South Africa; chief city of a district of the same name; situated on a promontory at the west end of Algoa Bay, facing the Indian Ocean, connected by railroad with Kimberley, on the north, with Grahamstown, 85 miles away, toward the northeast, and with Bathurst, the chief maritime city of the colony; harbor good and under constant improvement; has extensive evaporating salt-works. Population 1891, 23,266. See also PORT ELIZABETH, Vol. XIX, p. 527.

PORTER. See BREWING, Vol. IV, p. 270.

PORTER, ALEXANDER, an American jurist; born in Armagh, Ireland, in 1796. His father was a Presbyterian minister and a lecturer on chemistry, and in 1798, coming under suspicion as an insurgent

spy, was seized and executed. Three years later the son accompanied his uncle to America, settled at Nashville, Tennessee, studied law and was admitted to the bar in 1807. Removing to Louisiana, he was elected to the state constitutional convention of 1811. He became judge of the supreme court of the state in 1821, which position he held until 1833. From 1834 until 1837 he was United States Senator, during his term voting to censure President Jackson, and supported Calhoun's motion to reject petitions for the abolition of slavery in the District of Columbia. He was again sent to the Senate in 1843, and died in Attakapas, Louisiana, Jan. 13, 1844. He introduced the system of jurisprudence which came into general use in Louisiana.

PORTER, CHARLES T., an American mechanical engineer; born in Auburn, New York, Jan. 18, 1826; graduated at Hamilton College, studied law and practiced in Rochester and New York, but gave up the profession for engineering; designed an engine known as the Porter-Allen engine and formed a partnership with J. F. Allen for its manufacture. He also invented governors for stationary and marine engines, and was one of the founders of the American Society of Mechanical Engineers.

PORTER, DAVID, an American naval officer; born in Boston, Massachusetts, Feb. 1, 1780. He served on a merchantman under his father, during his youth, and entered the navy in 1798; took part in the Tripolitan war (1801-06); was taken prisoner in the *Philadelphia* and remained a captive for 18 months; commanded the *Essex* in the War of 1812, and captured the *Alert*, the first British war-vessel taken in the war. His own ship was captured in the harbor of Valparaiso, March 28, 1814. He was navy commissioner (1815-23); court-martialed and suspended for six months for disobedience (1825); resigned his commission and took charge of the Mexican navy (1826); was consul at Algiers (1829); minister to Turkey (1831). He published *Journal of the Cruise of the Essex* (1815) and *Constantinople and Its Environs* (1835). He died near Constantinople, March 3, 1843. His son, D. D. Porter, wrote his *Life*.

PORTER, DAVID DIXON, an American admiral; born in Chester, Pennsylvania, June 8, 1813. He entered the United States navy (1829); was employed on the Coast Survey from 1836 to 1841, when he became lieutenant, and then served till 1845 on the Mediterranean and Brazil stations, afterward returning to the Coast Survey. From 1849 to 1853 he was engaged in command of the California mail steamers. At the commencement of the Civil War he was appointed commander of the steam-frigate *Powhatan*, and ordered to Pensacola; but afterward he was placed in command of the mortar flotilla, joined Farragut, and in



ADMIRAL PORTER.

April, 1862, successfully bombarded the New Orleans forts. In September, 1862, he received the command of the Mississippi squadron, and succeeding in running past the batteries of Vicksburg, poured a heavy cannonade on the city, and assisted materially in bringing about its fall in July, 1863, for which he was promoted to rear-admiral. Transferred to the North Atlantic squadron in 1864, in December he bombarded and silenced Fort Fisher, at the mouth of Cape Fear River; and in January, 1865, after seven hours' fighting, the fortress was taken by the combined land and naval forces. Porter was made vice-admiral in 1866, and appointed superintendent of the Naval Academy at Annapolis; in 1870 succeeded Farragut as admiral of the navy. He was the author of *Incidents and Anecdotes of the Civil War* (1885) and of a *History of the Navy in the War of the Rebellion* (1887), besides three romances. He died Feb. 13, 1891, in Washington, District of Columbia.

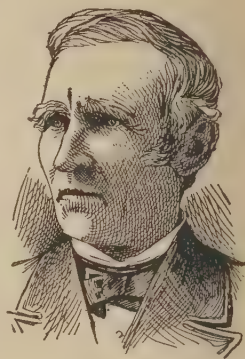
PORTER, FITZ-JOHN, an American soldier, nephew of Commodore David Porter; born in Portsmouth, New Hampshire, June 13, 1822. He graduated at West Point in 1845 and served throughout the Mexican War, in which he was wounded; was instructor at West Point. At the outbreak of the Civil War he became colonel of a volunteer regiment, and a few days later was made brigadier-general. He took part in the peninsula campaign, was made major-general of volunteers in 1862 and attached to General John Pope's army of Virginia. After the second battle of Bull Run he was charged with having disobeyed orders, and cashiered in 1863. He made numerous appeals for redress during many years, with the result that the sentence was partially remitted in 1882. Finally, he was fully restored in 1886, and placed on the retired list at his own request. He served as police commissioner in New York from 1884 to 1888.

PORTER, HORACE, an American soldier; born in Huntingdon, Pennsylvania, April 15, 1837. He entered the Lawrence Scientific School at Harvard, but left there for West Point, where he graduated in 1860. He commanded the artillery in the siege of Fort Pulaski, April, 1862; served in the army of the Potomac until after the battle of Antietam, as ordnance-officer on the staff of General Rosecrans throughout the Chickamauga campaign, and as aid to General Grant during the remainder of the war, gaining the brevet of brigadier in 1865. He was assistant secretary of war while Grant was at the head of that department, and in Grant's first administration was his private secretary. He resigned his commission in 1873, and later became president of the West Shore railroad. He wrote *West Point Life* (1866). Appointed minister to France in 1897.

PORTER, JOSIAS LESLIE, an Irish clergyman and author; born Oct. 4, 1823. He was educated at Glasgow and Edinburgh; pastor at Newcastle-on-Tyne, and Presbyterian missionary in Damascus (1849-59); professor in the Assembly's college in Belfast (1860-77); president of Queen's College, Belfast, from 1879 till his death. He published *Five Years in Damascus* (1855); *Handbook for Syria and Palestine* (1858); *The Pentateuch and the Gospels* (1864);

The Life and Times of Henry Cooke (1871); and *The Pew and Study Bible* (1876). He died March 16, 1889.

PORTER, NOAH, an American educator and author; born at Farmington, Connecticut, Dec. 14, 1811. He was educated at Yale College, graduating in 1831; taught in Hopkins Grammar School at New Haven (1831-33); was a tutor at Yale (1833-35), and at the same time studied theology; became pastor in New Milford, Connecticut (1836); at Springfield, Massachusetts, in 1843; chosen professor of metaphysics and moral philosophy at Yale (1846); traveled in Europe (1853-54); made president of Yale (1871); resigned the presidency in 1885, but retained his professorship until his death. Dr. Porter was the editor of the revised editions of *Webster's Dictionary* of 1864, 1880 and 1890, and was the author of *The Human Intellect, with an Introduction upon Psychology and the Soul* (1868); *Books and Reading* (1870); *American Colleges and the American Public* (1870); *The Science of Nature versus the Science of Man* (1871); *Science and Sentiment* (1882); *Elements of Moral Science* (1885); *Bishop Berkeley* (1885); and *Kant's Ethics* (1886). He died March 4, 1892.



DR. NOAH PORTER.

PORTER, THOMAS CONRAD, an American botanist; born in Alexandria, Pennsylvania, Jan. 22, 1822. He was educated at Lafayette College and Princeton Theological Seminary; pastor of a Presbyterian church in Monticello, Georgia, and later of a reformed German church in Reading, Pennsylvania; professor of natural sciences in Marshall College (1849-53); in Franklin College (1853-66); was chosen professor of botany at Lafayette College in 1866. Among his works are *Sketch of the Flora of Pennsylvania* (1872); *Sketch of the Botany of the United States* (1873); *A Synopsis of the Flora of Colorado*, with J. M. Coulter (1874); *A List of Carices of Pennsylvania* (1887); and *A List of Grasses of Pennsylvania* (1893).

PORT EWEN, a village of Ulster County, southeastern New York, on the right bank of the Hudson, four miles below Kingston, near the West Shore railroad. It is an important point for the transshipment of coal. Population 1890, 1,211.

PORT GIBSON, a village and the capital of Claiborne County, southwestern Mississippi, 29 miles S. of Vicksburg, on Bayou Pierre, twenty miles from its mouth, in the Mississippi, and on the Illinois Central railroad. It is surrounded by a cotton-growing district, and has a considerable trade. It has two academies, Masonic hall and county buildings. Population 1890, 1,524.

PORT HAMILTON. See COREA, Vol. VI, p. 391.

PORT HENRY, a village of Essex County,

northeastern New York, on Lake Champlain, 40 miles N. of Whitehall, on the Delaware and Hudson railroad. It has valuable iron-mines and several furnaces and bloomeries. Much magnetic iron ore is exported. Population 1890, 2,436.

PORT HUDSON, a village on the east bank of the Mississippi River, in East Baton Rouge Parish, Louisiana. The place was strongly fortified by the Confederates in the fall of 1862 and garrisoned with 6,000 men under Gardner. Perceiving that it was a desirable point from which to command the river from Vicksburg to New Orleans, on March 8, 1863, Banks with a land force of 12,000 and Farragut with his fleet of gunboats and mortar-boats made a concerted attack upon the works, which resulted in a repulse for the Union forces. On May 23d Banks invested the place with 18,000 men, and on the 27th a general assault was made, which again resulted in defeat. The siege continued until July 9, 1863, when, upon hearing the news of the fall of Vicksburg, the Confederate commander surrendered to General Banks. The entire Union loss was 4,300; the Confederate loss before the surrender, 800. Port Hudson was the last fortified place of importance on the Mississippi to surrender to the Unionists. Population 1890, 250.

PORT HURON, a city of Michigan. The city has a fine custom-house, shipyards and dry-docks, saw-mills, grain-elevators, the machine and railroad shops of the Grand Trunk railroad, flour-mills, foundries, carriage and wagon shops, marble-works, cigar factories, planing-mills, engine-works, breweries, bottling-works and lime-kilns. Much pine timber is brought down by the Black River. A railway tunnel passing under the St. Clair River connects the town with Sarnia, in Canada, and steamboats ply daily, except in winter, between Port Huron and Detroit. It has 25 hotels, and is supplied with city water, electric lights and railway, and gas. Population 1890, 13,543; 1894, 16,165. See also PORT HURON, Vol. XIX, p. 528.

PORT JEFFERSON, a village of Suffolk County, southeastern New York, on Long Island and Long Island Sound, 48 miles E. of New York City, on the Long Island railroad. It has a good harbor, and is engaged in shipbuilding. Population 1890, 2,026.

PORT JERVIS, a village of New York, 60 miles N.W. of New York City. It contains railroad-shops, planing and other mills, glassworks and manufactories of boots and shoes, gloves and watch-cases. Population 1890, 9,327. See PORT JERVIS, Vol. XIX, p. 528.

PORTLAND, a town of Middlesex County, Connecticut, on the Connecticut River, opposite Middletown, and on the New York, New Haven and Hartford railroad. It is engaged in the quarrying of brown sandstone and in manufacturing steam-governors, foundry and machine-shop products. Population 1890, 4,687.

PORTLAND, a city and the capital of Jay County, central eastern Indiana, on Salamonie River and on the Grand Rapids and Indiana and the Lake Erie and Western railroads, 48 miles S. of Fort Wayne. It is in a lumbering region; has a

natural-gas supply, and has lumber and flour mills and wood-working industries. Population 1890, 3,729.

PORTLAND, the largest city and chief seaport of Maine. The city has a large granite government building of great beauty and a post-office of white marble. There are about 20 school buildings, and 9 libraries containing over 70,000 volumes. In 1890, 662 manufacturing establishments reported to the census bureau; these had an aggregate capital of \$6,900,000; employed 6,260 hands, and paid \$3,100,000 in wages. Value of annual products, \$11,400,000. The city is supplied with electric and gas lights, sewer systems and street-railways. Its assessed valuation is about forty million dollars, and the net debt \$15,000,000. Population 1890, 36,425. See PORTLAND, Vol. XIX, pp. 528, 529.

PORTLAND, a village of Ionia County, southwestern central Michigan, on the Grand River, 28 miles W.N.W. of Lansing, on the Detroit, Lansing and Northern railroad. It is in a wheat-raising region; has an abundant water-power and produces a variety of manufactures, including sash, blinds, doors, staves, furniture, lumber, land-rollers, refrigerators, washing-machines and woolen goods. Population 1890, 1,678; 1894, 1,734.

PORTLAND, a city of Oregon. Its most important buildings and institutions include the City Hall, Chamber of Commerce, the Union Depot, the Hotel Portland, the Bishop Scott Academy, St. Helen's Hall, St. Michael's Academy, Portland Academy, the medical departments of the state and Willamette universities, and a business college. The manufacturing establishments which reported in 1890 numbered 569, and had \$17,000,000 capital, employed 9,731 hands and turned out products valued at \$25,000,000 annually. Its streets are paved with granite blocks, and provided with horse, cable and electric railroads. It owns its water-works, and has electric and gas-light plants, and a public free library containing 16,000 volumes. Assessed valuation about sixty million dollars; debt, a little less than three millions, a large part of which is in water-bonds. Population 1890, 46,385. In 1891 Albina and East Portland were annexed. Population 1895, 81,342. See PORTLAND, Vol. XIX, pp. 529, 530.

PORTLAND UNIVERSITY, a Methodist Episcopal co-educational institution, situated in Portland, Oregon. The institution was founded in 1890, and in 1895 had 26 instructors. There were 320 students in attendance. The library contains 2,500 volumes.

PORTLAND VASE. See GLASS, Vol. X, p. 649.

PORT MAHON, Minorca. See BALEARIC ISLANDS, Vol. III, p. 278.

PORT ORCHARD, a United States naval station in Kitsap County, western central Washington, 14 miles W. of Seattle, on Puget Sound. It is the place selected by a Congressional commission for the construction of a dry-dock, for which was appropriated \$700,000. The dock is 600 feet long, 75 feet wide at the bottom, and of sufficient depth to accommodate vessels of 30 feet draft.

PORT RICHMOND, a village of New York, on

the north shore of Staten Island, $2\frac{1}{2}$ miles from West New Brighton, on the Staten Island Rapid Transit railroad; about nine miles from New York, with which it has daily steamboat connections. It contains important manufactories of brick, white-lead and linseed-oil. Population 1890, 6,290.

PORT ROYAL, a village on the Atlantic Coast, in Beaufort County, South Carolina. At the beginning of the Civil War the harbor of Port Royal was defended by two forts, Fort Walker and Fort Beauregard, which were garrisoned with 1,700 men under the Confederate generals Drayton and Ripley, and by six gunboats commanded by Commodore Tattnall. An attack on the place was made Nov. 7, 1861, by the Union frigate *Wabash*, in command of Commodore Dupont, together with fourteen gunboats. The fleet entered the harbor and fired on both forts simultaneously, then concentrated their attack on Fort Walker, which surrendered in three hours. Fort Beauregard surrendered soon afterward.

PORTSMOUTH, a city of New Hampshire. The city has two libraries containing over 26,000 volumes, a valuable museum and several homes and asylums. Population 1890, 9,827. See PORTSMOUTH, Vol. XIX, p. 535.

PORTSMOUTH, a city of Ohio. It has breweries, stone-mills and manufactures stoves, nails, steel springs, furniture, machinery, boots, veneer, wheels and fire-brick. It is in a fertile agricultural region, which is also rich in iron-ore. Population 1890, 12,394. See PORTSMOUTH, Vol. XIX, p. 535.

PORTSMOUTH, a city of Virginia. It has regular steamboat communication with Baltimore, and connects with all the principal Atlantic ports. It has shops of the Seaboard Air-Line railroad. Principal exports, cotton, lumber, oak staves, naval stores and pig-iron. Population 1890, 13,268. See PORTSMOUTH, Vol. XIX, p. 535.

PORT TOWNSEND, a city, port of entry and the capital of Jefferson County, Washington, on Puget Sound, near Juan de Fuca Strait, 42 miles N.N.W. of Seattle, and on the Port Townsend Southern railroad. It has a good harbor and an important United States customs station, at which all vessels entering or leaving the sound must report. Established here by the government is Fort Townsend; and Point Hudson, Point Partridge and Morrowstone Point have been reserved as sites for fortifications. Port Townsend has a marine hospital and a quarantine station; it is supplied with water from Little Quilcene-River, and has several street-railways, banks and papers. It has regular daily steamboat connection with Victoria, British Columbia. It manufactures flour and lumber, iron castings and machinery, steel wire and nails. Population 1880, 917; 1890, 4,558.

PORTUGAL. (For general article, see PORTUGAL, Vol. XIX, pp. 536-558.) The population is 5,082,257. The reigning king is Carlos I; born Sept. 28, 1863, son of Luis I and his Queen, Maria Pia, daughter of King Vittorio Emanuele, of Italy; married May 22, 1886, Marie Amélia, daughter of Philippe Duc d'Orléans, Comte de Paris; succeeded to the throne Oct. 19, 1889.

Carlos I has a civil list of \$336,960, while his consort has a grant of \$51,840. The whole grants to the royal family amount to \$493,344.

CONSTITUTION AND GOVERNMENT. The crown is hereditary in the female as well as male line, but with preference of the male in case of equal birthright. The constitution recognizes four powers in the state—the legislative, the executive, the judicial and the “moderating” authority, the last of which is vested in the sovereign. There are two chambers, the “Camera dos Pares,” or House of Peers, and the “Camera dos Deputados,” or House of Commons, which are conjunctively called the Cortes. The law of July 24, 1885, abolished hereditary peerages, though only by a very gradual process. The law of 1895, made without the concurrence of the parliament, fixed the number of life peers, which are to be nominated by the crown, at 90, exclusive of the 12 bishops of continental dioceses and princes of the royal blood. The elective portion of the chamber provided for in the law of 1885 was done away with. The members of the second chamber are chosen in direct election by all citizens, 21 years of age, who can read and write and who pay taxes amounting to \$540. The deputies must have an income of at least \$432 per annum; but lawyers, professors, physicians or the graduates of any of the learned professions need no property qualification. The lower house consists of 120 deputies, elected by universal suffrage, of which six are chosen by the colonies. The annual session lasts three months, and fresh elections must take place at the end of every four years. In case of dissolution a new parliament must be called together immediately. The general Cortes meets and separates at specified periods, without the intervention of the sovereign, and the latter has no veto on a law passed twice by both houses.

The executive authority rests, under the sovereign, in a responsible cabinet divided into seven departments, in charge of the ministries. The sovereign is permitted, in important cases, to take the advice of a council of state or privy council, consisting, when full, of 13 ordinary and three extraordinary members nominated for life. During the years 1894-95, parliamentary government was suspended and legislation was accomplished by royal decrees. It was during this period that the decrees changing the constitution of the Cortes were promulgated. Other proclamations were made, by one of which the Azores received autonomous government (March 24, 1895). Parliamentary elections were held Nov. 17, 1895.

The colonial possessions of Portugal in Africa are Cape Verde Islands, Guinea, Prince's and St. Thomas's islands, Angola, Ambriz, Benguela, Mossamedes, Congo and East Africa. In Asia: Goa in India, Damao, Diu, etc.; Timor in the Indian Archipelago and Macao in China. Total population of colonies, 5,371,200; total area, 743,204 square miles.

FINANCE. The budget estimates for the fiscal year ending in 1895 were: Total revenue, \$51,309,290; total expenditures, \$51,120,580. Portugal has a total debt of \$721,661,904.

DEFENSE. The fortified places of Portugal in

1891 were in a state of decay. They were Elvas, Jerumenha, Campo Mayor, Marvao, Peniche, Nonsando, Almeida and the forts of Lisbon; there are several naval harbors.

The army of the kingdom is formed partly by conscription and partly by voluntary enlistment. Its organization is based on the law of June 23, 1864, modified by subsequent laws in 1868, 1869, 1875, 1877, 1884 and 1885. All young men of 21 years of age, with certain exceptions, are obliged to serve. By the law of 1884 the army consists of 24 regiments of infantry, 12 regiments of chasseurs, 10 regiments of cavalry, 3 regiments of mounted artillery, 1 battery of mountain artillery, 1 regiment and 4 companies of garrison artillery and 1 regiment of engineers. The duration of service is 12 years—3 with the active army, 5 in the first, and 4 in the second, reserve. The strength of the army was, in 1893, 34,172 men of all ranks, including municipal and reserve guards. There were 4,762 horses and mules. The effective war strength is about 150,000 men, 12,690 horses and mules, and 264 guns. There are maintained in the colonies 8,880 officers and men, besides native troops.

The navy in 1895 consisted of 1 ironclad (of 7 guns), 6 corvettes, 14 gunboats, 2 transports, 4 torpedo-boats, 5 monitors and 10 sloop gunboats. The navy is officered by 2 vice-admirals, 11 rear-admirals, 35 captains, 42 lieutenant-captains, and a total of 4,360 men.

COMMERCE, SHIPPING AND INTERNAL COMMUNICATION. Imports, in 1894, \$38,515,499; exports, \$32,304,736. The imports from the United States amounted to \$5,559,743, and the exports to the United States amounted to \$768,868. Wine was the chief export.

The commercial navy of Portugal consisted, in 1895, of 67 steamers and 486 sailing-vessels.

Including coasters and vessels calling at different ports, there entered the ports of Portugal, the Azores and Madeira, in 1895, 5,556 sailing-vessels of 488,000 tons and 5,118 steamers of 6,720,000 tons.

The length of railways open for traffic in 1892 was 1,419 miles, of which 914 belonged to the government. All the railways receive subventions from the state.

PORTUGUESE EAST AFRICA. See AFRICA, in these Supplements.

PORTUGUESE LANGUAGE. See PORTUGAL, Vol. XXII, p. 351.

PORTUGUESE LITERATURE. See PORTUGAL, Vol. XIX, p. 555.

PORTUGUESE WEST AFRICA. See AFRICA, in these Supplements.

PORTULACA. See PURSLANE, Vol. XX, p. 116.

PORT WASHINGTON, a city and the capital of Ozaukee County, central eastern Wisconsin, 24 miles N. of Milwaukee, on Lake Michigan and the Chicago and North-Western railroad. It has a large tannery, chair and wooden-ware factories and several foundries. Population 1890, 1,659; 1895,

PORT WINE. See WINE, Vol. XXIV, p. 607.

POSILLIPO. See NAPLES, Vol. XVII, p. 188.

POSITIVE PRINTING PROCESSES. See PHOTOGRAPHY, in these Supplements.

POSITIVISM. See COMTE, Vol. VI, pp. 234-238; also POLITICAL ECONOMY, Vol. XIX, pp. 390, 391.

POSSE COMITATUS, the power of the county. Under the common law the sheriff or any peace officer, while acting under the authority of a legal writ, has a right to call to his aid any or all citizens of the county for the purpose of preserving the public peace or executing legal process.

POSTAL SERVICE OF THE UNITED STATES. (For early statistics and description, see POST-OFFICE, Vol. XIX, pp. 578, 579; also see POST-OFFICE DEPARTMENT, in these Supplements.) The postal service was greatly improved during the ten years including 1886 and 1895. The development of the international service has been brought about by the growth of the individual state service. This growth has not been in the United States alone, but also in every country on the globe. The United States with its vast extent has presented a field for the development of the postal service on a large scale. The number of post-offices in the United States in 1895 was 70,064, while in 1890 there were 62,401 and in 1880, 42,989. Of 68,403 offices in 1893, 3,360 were Presidential; the remainder, of the fourth class. The total length of all mail routes in 1894 was 454,746 miles, and the gross revenue \$76,983,128 and the expenditures \$86,790,172. From a total business of 1,000 letters a day, which was the estimate of the Postmaster-General in 1789, it is estimated that the number has so increased that 8,000 pieces are handled each minute.

There are several branches of the postal service which deserve special description:

1. THE MONEY-ORDER SYSTEM, created by act of Congress approved May 17, 1864. It provides the public with the means of making small remittances of money by mail cheaply and safely. This is accomplished through the issue of orders by one postmaster upon another. These orders are issued upon written applications therefor, the purchaser of the order being required to deposit with his application the amount of money for which he desires the order to be made, in addition to the fee. After the order is delivered to the purchaser, he sends it to the payee. At the same time a duplicate slip is sent the postmaster upon whom the order is drawn. The latter obtains the amount called for in the order from the postmaster at the receiving office, upon presentation of the order.

Money orders are limited by law to \$100, the fees for amounts up to that being (1895) as follows: For sums not exceeding \$2.50, 3 cents; over \$2.50 to \$5, 5 cents; over \$5 to \$10, 8 cents; over \$10 to \$20, 10 cents; over \$20 to \$30, 12 cents; over \$30 to \$40, 15 cents; over \$40 to \$50, 18 cents; over \$50 to \$60, 20 cents; over \$60 to \$75, 25 cents; over \$75 to \$100, 30 cents. For international money orders, the rates are: For sums not exceeding \$10, 10 cents; over \$10 and not exceeding \$20, 20 cents; over \$20 and not exceeding \$30, 30 cents; over \$30 and not exceeding \$40, 40 cents; over \$40 and not exceeding \$50, 50 cents; over \$50 and not exceeding \$60, 60 cents; over \$60 and not exceeding \$70, 70 cents;

over \$70 and not exceeding \$80, 80 cents; over \$80 and not exceeding \$90, 90 cents; over \$90 and not exceeding \$100, one dollar. The order is always upon a designated postmaster, and therefore can be paid by no other, and it is invalid if not presented within one year from its date. Postal notes, the issue of which was authorized in 1883, were withdrawn in 1894.

2. THE REGISTRY SYSTEM was first authorized by act of Congress of March 3, 1855. It gives additional security to valuable matter in its passage through the mails. The means relied on for giving this security consists in the recording, or registering, of all matter presented for registration, the giving of receipts to the senders at the time of mailing, the receipting and careful handling of the matter by all persons through whose hands it passes throughout its journey, and the addressee's final acknowledgment of having received it. A letter registered may be traced from hand to hand until it gets to its destination, or, in case of loss or mis-carriage, up to the official who is responsible for it. Registered matter is inclosed in large colored envelopes, termed "registered package envelopes." They may contain one or more letters to any one post-office. The condition of these envelopes must be indicated by the indorsements of all who handle them. A bill of lading or "registry bill" accompanies these envelopes, which bill, after verification, is returned by the receiving postmaster to the sending postmaster. A great part of the separate handling of registered matter has lately been obviated by the use of "through pouches" between prominent post-offices, the pouches being locked with the tell-tale locks, that can be opened only by the sending and receiving postmasters. All kinds of postal matter may be registered at the rate of eight cents for each package in addition to the regular rates of postage, to be fully prepaid by stamps. Each package must bear the name and address of the sender. Mail matter can be registered at all post-offices in the United States. The Post-Office Department is not by law liable for the loss of any registered or other mail matter.

3. THE FREE-DELIVERY SYSTEM was authorized by act of Congress, March 3, 1863. Its function is to deliver letters and other mail-matter at the places designated in the addresses. This is done by carriers employed by the government. The same carriers also collect mail-matter from the street-boxes, wherein the letters are deposited by the senders. The term "free-delivery" is not correct, for while no direct charge is made for delivering matter by the carriers, there is an indirect charge, made by doubling the local or drop rate of postage on letters at all free-delivery offices. Thus, at an office where carrier delivery is not made, the drop rate on letters is one cent an ounce or fraction thereof; at a free-delivery office the drop rate is two cents—the difference being originally intended to maintain the system. Under the law passed by Congress affecting the free-delivery system, authority is given the Postmaster-General to establish it at any place having a population of 10,000, or where the gross revenue of the post-office for the

preceding year shall have amounted to \$10,000. The total number of free-delivery offices in existence on June 30, 1888, was 358. In 1889, 43 post-offices were enlarged to free-delivery offices, and, in 1890, 53 offices were made free-delivery offices.

4. THE SPECIAL-DELIVERY SYSTEM was authorized by act of Congress of March 3, 1885. Its function is to deliver mail matter immediately to the addressee, when it arrives at post-offices. Special messengers are employed for this service. At first this system was confined to places having a population of four thousand or more. But by a subsequent law it was extended to all post-offices. To secure special delivery the sender must affix to the letter, in addition to the postage, a large "special-delivery" stamp, which costs ten cents. Messengers are allowed eight cents for every special delivery. The government thus makes a profit of two cents on each letter. The amount of this profit is about \$30,000 a year. At large post-offices permanent messengers are employed on special-delivery duty. At other offices the postmaster effects delivery by any practicable means.

5. THE DEAD-LETTER OFFICE has the function to restore to the owners letters and other mail matter that have failed of delivery. Everything is restored except printed matter of no apparent value or interest, such as advertisements, circulars, etc. If the matter bears upon it on the outside the name and address of the sender, it is returned to him direct by the receiving postmaster at the end of thirty days; if it bears a request to return within a given time, it is returned direct at the end of the time named. If it does not bear the name of the sender on the outside, it is advertised, and if not delivered it is retained in the post-office for thirty days, and finally sent to the Dead-Letter Office in Washington, where it is opened, if found necessary, and restored to the owner. Weekly returns of such matter are made by postmasters at the larger offices; monthly returns by all others. The registered matter is recorded, and promptly restored to the senders. Matter of which the ownership cannot be ascertained is held subject to reclamation. All foreign dead letters are returned without examination to the country of their origin. Much of the matter that reaches the Dead-Letter Office is never restored, especially if neither the sender nor addressee of the matter can be found, and if no inquiry concerning it is received, or if the writer of a letter has failed to sign his or her name, as it happens very frequently.

In 1890 about $5\frac{1}{2}$ per cent of the whole number, or, in round numbers, 319,000, of all letters opened contained valuable inclosures, either of money, negotiable paper, postage-stamps or miscellaneous papers and articles. The money inclosures alone amounted to over forty thousand dollars, and those representing negotiable paper to over one million four hundred thousand dollars. There were nearly eleven thousand letters which contained lottery tickets, and nearly two hundred thousand contained pictures and papers of a character unfit for circulation. These were all destroyed.

Nearly three hundred thousand letters which contained inclosures were returned to the owners, and

about three and a quarter million pieces, on failure after every effort had been made to reach the owners, were destroyed. Parcels of merchandise unclaimed for two years are annually disposed of at auction.

6. THE TRANSPORTATION OF THE MAILS is done by five general methods, namely: by railroads, by steamboats, by mail-messengers, by ocean steamers, and by what is known as "star" service. The pay for "railroad transportation" is prescribed by law of Congress. The companies are required to transport the mails on their fastest trains, and also to carry them to and fro between railroad stations and post-offices at their own expense, if the distance is not over one fourth of a mile. "Mail-messenger" service comprises the carrying of the mails between post-offices and railroad and steamboat stations where the distances are over one fourth of a mile; between one station and another of different railroads; between post-offices and their branches in large cities; and over routes not regularly established as post-routes. "Steamboat" service is usually contracted for four years at the lowest obtainable rates; while "ocean-steamship" service is let for periods of two years. The latter is confined to the foreign mails. The "star" service includes transportation by wagon, carriage, stage, horseback, or afoot. The routes are designated by a star in the book of routes at the department. This service is let every four years to the lowest bidder. Competition has brought the pay over the star routes down to low rates, in some cases too low to secure good service.

POSTAL REGULATIONS. All mailable matter in the United States is divided in four classes:

The matter known as *First-class* includes letters, postal-cards and anything sealed or otherwise closed against inspection, or anything containing writing not allowed as an accompaniment to printed matter under class three. Rates of letter postage to any part of the United States, two cents per ounce or any fraction thereof. The same rate applies to letters at free-delivery offices, but at offices where there is no free delivery, letters for local transmission are to be paid for at the rate of one cent per ounce or fraction thereof. Postal-cards are carried for one cent, providing nothing be attached to them and nothing but the address be placed on the stamped side. Postage on all letters should be prepaid, but will be carried if one full rate be prepaid. Letter rates are charged on all productions by the typewriter and on all printed imitations of the typewriter. Letters will be returned to the sender free. There is no limit of weight for first-class matter. The direction on forwarded letters may be changed as many times as may be necessary to reach the persons addressed.

Second-class Matter includes all newspapers, periodicals or matter exclusively in print and regularly issued at stated intervals, as frequently as four times a year, from a known office of publication, to actual subscribers or news-agencies. Periodicals and reports of secret-society officers are included in this class, provided that they be issued not less than four times a year. Publishers who wish to avail themselves of this privilege are required to make formal application through the postmaster at the place of publication. Rates of postage to publishers, one cent a pound or fraction thereof, prepaid. Publications not having a legitimate list of subscribers and designed primarily for advertising or free circulation are excluded from the pound rate, and pay third-class rates. Special editions are excluded from the second-class rates, and issues in which space is given to the advertisement of some special firm, and the issue is circulated free in large numbers or a larger price than customary is to be charged. Publica-

tions sent to actual subscribers in the county of publication are to go free, unless mailed for local delivery at a letter-carrier office. Rates of postage on transient newspapers or periodicals, one cent for each four ounces or fraction thereof. Second-class matter will be entitled to special delivery when special-delivery ten-cent stamps are affixed in addition to the regular postage. Transient second-class matter must be so wrapped as to enable the postmaster to inspect it. Any writing other than the address and the sender's name and address subjects the matter to letter postage.

Third-class Matter includes printed books, engravings and other matter wholly in print, proof-sheets and manuscript copy accompanying the same. The rate on matter of this class is one cent for each two ounces or fraction thereof. Third-class matter must admit of inspection; must be fully prepaid, and no writing other than the address and return directions can be on the wrapper. The limit of weight is four pounds, except single books in separate packages, on which the weight is not limited. A simple manuscript dedication may appear in a book or other third-class matter.

Fourth-class Matter includes all mailable matter not included in the three preceding classes, which is so prepared for mailing as to be easily withdrawn from the wrapper and examined. It embraces merchandise, samples of all description, and coin or specie. Rate of postage, one cent for each ounce or fraction thereof (except seeds, bulbs, etc., the rate on which is one cent for each two ounces or fraction thereof). Articles of this class that are liable to injure or deface the mails, such as glass, sugar, nails, etc., must be first wrapped in a bag or open envelope and then secured in an outside box made of wood or metal. Poisons, inflammable articles, insects, etc., will not be forwarded. Admissible liquids can be mailed to the extent of four ounces, liquid measure. Limit of weight of fourth-class matter, excepting liquids, is four pounds.

POSTAL UNION, UNIVERSAL. This is an association of states. The aim of this union is to form, for purposes of international and mail communication, a single postal territory embracing the whole world, with uniformity of postal charges and conditions of international exchange for all descriptions of correspondence.

The International Postal Convention, concluded at Berne, in October, 1874, went into operation on July 1, 1875. It began a new era in correspondence with the rest of the world. Nothing has contributed so much to a state of universal peace and amity, or to promote civilization and to disseminate truth and correct principles. By means of the efficient service of this union it is estimated that a letter can be sent around the world in 44 days. This is based upon an experiment to test the rapidity of the mail transit, conducted in 1891. The mail was timed from its departure from Yokohama, Japan, to its return there, having traversed the Pacific Ocean, North America, Atlantic Ocean, Europe, Suez Canal, Indian Ocean, and the Pacific Ocean again.

THE ORIGINAL MEMBERS. The countries forming the Postal Union on June 30, 1876, were as follows: The United States, Austria-Hungary, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, France (including Algeria), Germany (including the Island of Heligoland), Great Britain and Ireland (including Gibraltar, Malta and the dependencies of Malta), Greece, Italy, Luxemburg, Montenegro, Netherlands, Norway, Portugal (including the Island of Madeira and the Azores), Roumania, Russia (including the Grand

Duchy of Finland), Servia, Spain (including the Balearic Isles, the Canary Islands, the Spanish possessions on the North Coast of Africa and the postal establishments of Spain on the West Coast of Morocco), Sweden, Switzerland, and Turkey.

ADDITIONAL MEMBERS. The following table shows the countries and colonies which were added, from 1876 to 1881, to the original postal-union formed by the treaty concluded at Berne, Oct. 9, 1874, and the dates upon which the said countries and colonies joined the union:

British India	July 1, 1876
French Colonies (except Bassam and Assinie)	July 1, 1876
Bermuda, Islands	April 1, 1877
Ceylon	April 1, 1877
Guiana (British)	April 1, 1877
Hong Kong	April 1, 1877
Jamaica	April 1, 1877
Labuan	April 1, 1877
Mauritius and dependencies	April 1, 1877
Straits Settlements	April 1, 1877
Trinidad	April 1, 1877
Tunis, Italian postoffice at	April 1, 1877
Netherlands Colonies in Asia, Oceania and America	May 1, 1877
Spanish Colonies in Africa, Asia, Oceania and America	May 1, 1877
Tunis, French post-office at	May 1, 1877
Tangier, French post-office at	May 1, 1877
Japan	June 1, 1877
Portuguese Colonies	June 1, 1877
Brazil	July 1, 1877
Hong Kong, post-offices at Canton, Swatow, Amoy, Foo Chow, Ningpo, Shanghai and Hankow (China)	Aug. 18, 1877
Danish Colonies of St. Thomas, St. Croix and St. Jean	Sept. 1, 1877
Greenland	Sept. 1, 1877
Persia	Sept. 1, 1877
Shanghai, French post-office at	Oct. 1, 1877
Cambodia, French post-office at	Jan. 1, 1878
Tonquin, French post-office at	Jan. 1, 1878
Argentine Republic	April 1, 1878
Hong Kong, post-offices at Hai-phung and Hainoi (Tonquin)	April 23, 1878
Canada	Aug. 1, 1878
Sudan	Aug. 14, 1878
Cyprus, Island of	Dec. 20, 1878
British Colonies on the west coast of Africa,	Jan. 1, 1879
Falkland Islands	Jan. 1, 1879
Honduras (British)	Jan. 1, 1879
Newfoundland	Jan. 1, 1879
Andorra, Republic of	April 1, 1879
Ionian Isles	April 1, 1879
Liberia	April 1, 1879
Lichtenstein, Principality of	April 1, 1879
Mexico	April 1, 1879
Monaco, Principality of	April 1, 1879
Nubia	April 1, 1879
Peru	April 1, 1879
San Marino, Republic of	April 1, 1879
Tripoli, Italian post-office at	April 1, 1879
Bulgaria	July 1, 1879
Leeward Islands (British)	July 1, 1879
Honduras, Republic of	Oct. 1, 1879
Venezuela	Jan. 1, 1880
Bahama Islands	July 1, 1880
Ecuador	July 1, 1880
French Colonies of Grand Bassam and Assinie (dependencies of Gaboon)	July 1, 1880
Uruguay	July 1, 1880
Dominica, Republic of	Oct. 1, 1880
Chile, Republic of	April 1, 1881
Colombia, United States of	July 1, 1881
Hayti, Republic of	July 1, 1881
Paraguay, Republic of	July 1, 1881
Guatemala	Aug. 1, 1881

The principal countries and colonies of postal and commercial importance not embraced in the union in 1890 were the Central and South American states of Nicaragua, Costa Rica, Bolivia, the Sandwich Islands, New Zealand and the British Colonies in Australia. The advantage of belonging to the union had, however, been by that time so thoroughly demonstrated that measures for entering it were taken by one country after another, until, in January, 1895, when New Zealand entered the compact, all the countries and colonies of the world maintaining organized postal services had become members of the Universal Postal Union, thus realizing the grand idea of its founders.

On Feb. 4, 1885, a congress composed of members delegated by the states of the postal union met at Lisbon, Portugal, and adopted a new convention, which went into effect on April 1, 1886, and which is now in force. Under the postal union an international bureau is maintained at Berne, Switzerland, through which correspondence is carried on between the several countries of the union relative to its common business, to the settlement of disagreements between two or more countries, to the tabulation and publication of statistics, and to all other matters that may be of interest or benefit to the postal world. The rates of international postage, as now fixed by the convention, are as follows: Letter, five cents a half-ounce if prepaid, and double this rate (to be collected on delivery of the matter) if not prepaid; postal-cards, two cents each; printed matter, commercial papers and samples of merchandise, one cent for each two ounces if prepaid, and double this rate if not prepaid.

POSTEL, KARL, an Austrian-American author, whose assumed name was "Charles Sealsfield"; born in Poppitz, Moravia, March 3, 1793. He joined an order of monks, but soon changed his mind, and, escaping, went to the United States, where he engaged in journalism. He was for a time on the staff of the *United States Courier* of New York. He afterward went back to Europe, but in 1832 returned to America, and traveled in Central America, Mexico and Louisiana. He published a number of miscellaneous works, among which are *Tokeah, or the White Rose* (1828); *Morton, or the Long Journey* (1846); and *Sweden and Norway* (1843). Under the pseudonym "Charles Sidons" he published a series of novels, the first of which was *The Legitimists and the Republicans* (1833). He died in Solothurn, Switzerland, May 26, 1864.

POST-OFFICE DEPARTMENT, THE UNITED STATES. The United States postal service is under the control of the Postmaster-General, who is, and has been since the administration of President Jackson, a member of the Cabinet. Under him are the first, second and third assistant postmasters-general, the superintendent of the money-order system, the general superintendent of the railway mail service, the superintendent of foreign mails, the chief post-office inspector and the superintendent of the dead-letter office, each of whom has under him a corps of clerks and other employees at the seat of government.

Beside these there is an officer of the Treasury Department, known as the Auditor of the Treasury for the Post-Office Department, who has a close and important connection with the postal service. The several classes of postal officials outside of the department proper at Washington are postmasters and their clerks, letter-carriers, railway postal clerks, mail-messengers and mail-contractors. The Postmaster-General appoints all officers and employees of the department, except the four assistant postmasters-general, who are appointed by the President; appoints all postmasters whose compensation does not exceed \$1,000; makes postal treaties with foreign governments, by and with the consent of the President; awards contracts; directs the foreign mail service; and exercises a general supervisory power. The first assistant postmaster-general has charge of the appointment and qualification of postmasters, the establishment of postoffices, the apportionment among them of the appropriations for clerk-hire, rent, light and fuel, the supply of stationery and the operations of the free-delivery system. The second assistant postmaster-general has control over the transportation of the mails, the making of contracts therefor, the ascertainment of the pay of railroads for mail service, and the supply of mail-bags, locks and keys. The duty of the third assistant postmaster-general takes in all the business relating to the classification of mail-matter and the rates of postage, the collection and deposit of the postal revenues, the payment of postal indebtedness, the control of the registry and special-delivery systems, and the issue to postmasters of postage-stamps, stamped envelopes and other forms of stamped paper. The duty of the auditor is to audit and settle quarterly the accounts of postmasters and other postal officers, and to certify for payment the several classes of postal indebtedness. The duties of the other officers named are indicated by their designations.

Since the organization of the department, in 1789, the following have served as Postmaster-General (the date of appointment is added): Samuel Osgood, 1789; Timothy Pickering, 1791; Joseph Habersham, 1795; Gideon Granger, 1801; Return J. Meigs, Jr., 1814; John McLean, 1823; William T. Barry, 1829; Amos Kendall, 1835; John M. Niles, 1840; Francis Granger, 1841; Charles A. Wickliffe, 1841; Cave Johnson, 1845; Jacob Collamer, 1849; Nathan K. Hall, 1850; Samuel D. Hubbard, 1852; James Campbell, 1853; Aaron V. Brown, 1857; Joseph Holt, 1859; Horatio King, 1861; Montgomery Blair, 1861; William Dennison, 1864; Alexander W. Randall, 1866; John A. J. Cresswell, 1869; James W. Marshall, 1874; Marshall Jewell, 1874; James N. Tyner, 1876; David McK. Key, 1877; Horace Maynard, 1880; Thomas L. James, 1881; Timothy O. Howe, 1881; Walter Q. Gresham, 1883; Frank Hatton, 1884; William F. Vilas, 1885; Don M. Dickinson, 1888; John Wanamaker, 1889; Wilson S. Bissell, 1893; William L. Wilson, 1895; James A. Gary, 1897.

POTASH. Ordinary commercial potash consists of the crude carbonate and hydrate of potash. It is chiefly obtained from wood-ashes, which contain it in abundance. The method pursued in the United States is to burn large heaps of wood to ashes. These are then placed in tubs made from barrels sawn in half, and with perforated false bottoms. About five per cent of lime is added, and the ashes are leached by successive applications of water, each of which is allowed to stand for an hour or two. The water is then drawn off from the bottom, the first draining being taken to the evaporating-pans, while the succeeding portions are kept to use on fresh ashes. Broad, shallow iron pans are used, in which the liquid is boiled till it becomes syrupy. It grows solid on cooling. The substance thus obtained is intensely alkaline. When purified by heating, becomes of a white, bluish or pearly cast, and is known as pearlsh. The lime used in its preparation acts to decompose the sulphate of potash, which forms one of the salts of the ashes and frees the potash. Potash exists to the amount of 12 per cent. in the mineral glauconite of the greensand deposits of New Jersey. This is more easily decomposed than feldspar, and is capable of yielding large quantities of potash. The greater cheapness of soda has enabled it to replace potash in most cases where an alkali is needed, but a steady demand exists for potash from its special adaptation to certain uses. Its principal uses are in the manufacture of soft-soap, of several important salts of potassium, and as a fertilizer. It is also used in the manufacture of glass, some of the best and most costly glasses now made, such as Bohemian white and English flint, being potash glasses. See MANURE, Vol. XV, p. 508; and POTASSIUM, Vol. XIX, pp. 588-593.

POTATO BUG OR BEETLE. See COLEOPTERA, Vol. VI, p. 134.

POTATO CROPS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

POTEKHIN, ALEKSEI ANTIPOVICH, a Russian writer; born in Kineshma, Kostroma, Russia, July 1, 1829. He wrote a number of novels and dramas. Some of his works have been condemned by the press censors. The reason for this is his faithful portrayal of the inner home and working life of the Russian peasantry. Among his dramas are *The Voice of the People, not the Voice of God* (1853) and *Tinsel* (1870); and the best known of his novels are *The Peasant Woman; For Money* (1879); and *Village Leeches* (1880).

POTENTIAL, ELECTRICAL. See ELECTRICITY, Vol. VIII, pp. 24-36; and ELECTRICITY, §§ 23, 25, 27, 28, in these Supplements.

POTENTIAL. See HORTICULTURE, Vol. XII, p. 259; and BLOOD-ROOT, in these Supplements.

POTGIETER, EVERHARD JOHANNES. See HOLLAND, Vol. XII, p. 98.

POT-HOLE. See GEOLOGY, Vol. X, p. 276.

POTSDAM, a village of St. Lawrence County, northern New York, on the Racket River, and the Rome, Watertown and Ogdensburg railroad,

22 miles E. of Ogdensburg. It has an abundant water-power and many quarries of Potsdam sandstone, from which it takes its name; and is the seat of a state normal and a state training school. It has large lumbering interests, quantities of timber being floated down to this point, and here converted into lumber; it contains foundries, machine-shops, furniture factories and agricultural tool works. It is supplied with water-works, and has electric lights, fair-grounds, and a public library. Population 1890, 3,961.

POTSDAM SANDSTONE. See GEOLOGY, Vol. X, p. 331.

POT-STONE. See MINERALOGY, Vol. XVI, p. 414.

POTT, AUGUST FRIEDRICH, a German philologist; born in Nettelrede, Hanover, Nov. 14, 1802. He studied at Göttingen, and attained such a rank as a comparative philologist that in 1833 he received an appointment as a professor in Halle. His best-known works are *Researches in the Etymology of the Indo-Germanic Languages* (1836); *Gypsies in Europe and Asia* (1845); *Etymological Researches* (1873); and *Proper Names* (1859). He died in Halle, July 5, 1887.

POTT, PERCIVAL, a British surgeon; born in London, England, in 1713. He was a specialist in the diseases of the spine, and "Pott's disease" received its name from his discovery of the causes of curvature of the spine. For 38 years he was a chief surgeon at St. Bartholomew's Hospital, London. He published a number of treatises, among them *Nature and Consequences of Wounds and Contusions of the Head* (1760); and *That Kind of Palsy of the Limbs which Attends Curvature of the Spine* (1779). He died Dec. 22, 1788.

POTTAWATOMIES, a tribe of North American Indians whose family relationships are given under *Algonquin*, in *INDIANS*, Vol. XII, p. 827, and who are further described on page 832. According to the United States government report for 1895 the Pottawatomies in that year numbered about 1,675, who were distributed on reservations as follows: In Kansas, 565; in Michigan, 77; in Oklahoma, at the Sac and Fox Agency, 753; and in Wisconsin, 280.

POTTER, ALONZO, an American clergyman; born in La Grange, Dutchess County, New York, July 6, 1800. He was graduated at Union College in 1818, and shortly after began his theological studies under the direction of Dr. S. H. Turner. At the age of 21 he became a professor of mathematics and philosophy in Union College, at the same time continuing his theological studies. He was shortly after made a deacon, and in 1824 was ordained a priest of the Protestant Episcopal Church, and immediately entered on the ministry of that communion in Boston. In 1832 he was again called to a professorship in Union College, this time to the chair of moral philosophy. In 1838 he was elected its vice-president, in which position he remained, being practically the head of the college, till his election to the bishopric of Pennsylvania in 1845. He was a man of great

executive ability in the management of church organizations. He was a prominent opponent of slavery. In 1858 his health began to fail under the pressure of his heavy duties, and, although an assistant was appointed to relieve him, the aid came too late, and he died in San Francisco seven years later, July 4, 1865. He published a number of treatises, among them *Discourses, Addresses, etc.* (1858); *Religious Philosophy* (1870); and *Hand-Book for Readers and Students* (1843).

POTTER, ELIPHALET NOTT, an American Protestant Episcopal clergyman, son of Alonzo Potter; born in Schenectady, New York, Sept. 20, 1836. He was graduated at Union College in 1861, and was ordained in 1862. He was rector in South Bethlehem, Pennsylvania, 1862-69, and in Troy, New York, 1869-71. During the time from 1866 to 1871 he held the chair of ethics in Lehigh University. He became president of Union College in 1871 and in 1884 of Hobart College, New York. He declined the bishopric of Nebraska in 1884.

POTTER, GEORGE, a British labor-unionist; born in Kenilworth, Warwickshire, England, in 1832. He learned the carpenter's trade, and afterward became a joiner. He became prominent in labor agitations; was an officer of the nine-hours movement committee in 1857, and was in charge of the building-trades strike of 1859. He founded and edited the *Beehive*, afterwards the *Industrial Review*. As president of the London Workingmen's Association he was instrumental in the gathering of the trades-union congress in 1868. He was a candidate for election to Parliament in 1874, in 1886 and in 1892, but was defeated each time. He was a contributor to the *Contemporary Review*. He died in London, June 3, 1893.

POTTER, HENRY CODMAN, an American clergyman; born in Schenectady, New York, May 25, 1835. He was graduated from Union College, Schenectady, and from the Theological Seminary of Alexandria, Virginia. His first rectorship was in a small village in Pennsylvania, from which he went to St. John's church, Troy, New York, and afterward to Trinity church, Boston. In 1868 he became rector of Grace church, New York, where he remained until 1883, when he was consecrated assistant bishop of New York. In 1887 the death of his uncle left him the sole responsibility of the episcopate. He published *Sisterhoods and Deaconesses* (1872); *The Gates of the East* (1876); *Sermons of the City* (1880); and *Waymarks, 1870-1891* (1892); besides a number of sermons and discourses.

POTTER, HORATIO, an American Protestant Episcopal bishop, brother of Alonzo Potter; born in Beekman, New York, Feb. 9, 1802. He was



BISHOP POTTER.

ordained in 1827, a year after his graduation at Union College in 1826. After a short term as rector in Saco, Maine, he was appointed to the chair of mathematics in Trinity College. From 1833 until 1854 he was rector in Albany, New York, and in 1854 was consecrated bishop of New York. He remained in active service until 1883, and died in New York City, Jan. 2, 1887.

POTTER, WILLIAM JAMES, an American-Unitarian clergyman; born in Dartmouth, Massachusetts, Feb. 1, 1830. He was pastor of the New Bedford (Massachusetts) church; president of the American Free Religious Association, 1882-93; and from 1880 to 1887 editor of *The Index*. He published numerous sermons and essays, the best known of which is *Twenty-five Sermons of Twenty-five Years* (1885).

POTTERIES, THE, a popular name for one of the busiest manufacturing centers in England, situated in the northwestern portion of Staffordshire, where the celebrated English earthenware and porcelain are made. The Potteries occupies the upper valley of the river Trent for a distance of about ten miles, and is rich in iron and coal. The clay and other materials used in the manufacture of pottery is brought from a distance. The district contains the towns of Stoke-upon-Trent, Hanley, Etruria, Burslem, Longton, Kidsgrove, Silverdale, Newcastle-under-Lyme, and several other villages, the population of which has gradually increased to such an extent that the district may now be described as one large and scattered town, with upward of 300,000 inhabitants. The importance of the industry is largely due to the enterprise of Josiah Wedgwood, Minton and Copeland. Steam street-railroads traverse the entire district, and a stipendiary police magistrate has been appointed to try petty offenders.

POTTERY INDUSTRY IN THE UNITED STATES. The development of the pottery industry in the United States during the last 16 years has been chiefly along the lines of improved quality, methods and workmanship. While the value of the annual production has increased to some extent, it has not gained to any material advantage, since domestic manufacturers are to-day supplying considerably less than 50 per cent of the goods consumed in this country, where in 1880 they were supplying over 40 per cent. The discrepancy between the advance made commercially and that made artistically may fairly be attributed to a governmental policy which has failed to recognize the peculiar susceptibility of this branch of manufacturing art to unforeseen and unavoidable accidents. That, in the face of obstacles and adversity, a National School of Ceramic Art (q.v., in these Supplements), in many respects as excellent as any in the world, should have been built up within the short space of twenty years, shows how determined has been the attempt to establish the industry in its highest form. No country is richer in the fine clays for either porcelain and china, earthen or stone wares, and nowhere are the materials, feldspar

and flint, found in greater abundance or purity than in the United States. With every natural advantage and the skill born of long research and experiment, the industry is handicapped solely by the fact that labor here must be and is better paid than anywhere else in the world. As labor constitutes nearly 90 per cent of the entire cost of pottery production, and as the wages of the workers in the American factory are 125 per cent more than those paid the English operative, more than double those paid in France and at least three times those paid in Germany, the absolute inadequacy of a tariff of 30 per cent becomes apparent.

Pottery in the United States to-day, as yesterday and as one hundred years ago, is made in the same way—by the hand of the potter molding and turning the plastic clay on his wheel, and firing the finished shape in the kilns. With the exception of machines for mixing clay, and the substitution of a power-driven wheel for the old "kick" wheel, machinery has never been and probably can never be introduced to any extent into the practice of potting. Methods have improved, knowledge broadened and treatments perfected and reduced to exactitudes, but never can the molding hand of the potter himself be replaced by the unyielding precision of machinery.

With these facts, which are peculiar to this single industry, given due consideration and weight, the year 1879, which marked the passing of the gold premium, may fairly be said to have inaugurated the second period in the development of the American pottery industry. The first period may be dated from 1861, and nothing but the long continuation of the gold premium sustaining an insufficient tariff could have enabled the potteries to emerge successful from the vicissitudes common to all new enterprises. That they did so, and that giant strides were made toward permanent establishment, is shown in the fact that by 1880 nearly \$5,000,000 worth of white ware was being turned out annually where prior to 1861 there was little or none, the production being chiefly the yellow and Rockingham wares with the cheap earthenwares, flower-pots, drain-pipes and stoneware. The value of the entire annual production of the factories of the United States in 1880 was nearly \$8,000,000, or two and three fourths times as much as that of twenty years before, while the capital invested was over three times as great. The industry had already centered at the two great points, Trenton, New Jersey, and East Liverpool, Ohio, where it still remains, there being also important potteries in Cincinnati, Wheeling, West Virginia, Baltimore, New York and Boston. The fine china clay or kaolin had been found and developed in many sections, notably in Pennsylvania, New Jersey, Delaware, Carolinas, Missouri and various southern states, together with other fine clays in Indiana, Ohio and Illinois. Maine was producing large quantities of the finest feldspar annually, and the great Maryland flint district of Harford County was well opened up. All these branches

were employing thousands of workmen, and their plants for the proper preparation of the raw material represented a capitalization of many thousands of dollars

The potteries themselves had begun to turn their attention to the making of finer goods and decorated wares. The thick, heavy earthenware or crockery of 1880 has been gradually replaced by the thin, semivitrified light and shapely wares of to-day. "Crazing" or crackling of the glazes has been done away with in so far as is possible in any commercial wares, and the more refractory materials common to this country have resulted in a tougher and more serviceable grade of goods than those made abroad. In sanitary goods great advances have been made as well, this branch of the pottery industry having grown to much greater prominence relatively than any other since 1880. The finest porcelain bathtubs are now made in several of the American factories, and knobs, druggists' sundries and other varieties of china fixings are produced in large quantities annually. In the main factories of these latter goods, machinery has been introduced to some extent, but the results are not of sufficient importance to modify the general statement previously made in this regard.

The number of potteries engaged in making ware for domestic uses, and exclusive of those making red flower-pots, common earthenware and drain pipes, terra cotta, etc., was, in 1894, 102, and of these several have since closed and many are running short time. Labor troubles as prolonged and bitter as have been known in any branch of industry have hurt the potteries greatly, and the last great general strike of 1893, lasting over six months and assuming political complications inimical to the industry, very nearly prostrated it. Followed as it was by sweeping tariff reductions, the potteries have never fully recovered, and the depression existing to-day is widespread and great. In a single year, that of 1893, the value of the annual production fell off thirty per cent, and at the present time ten million dollars is a generous valuation of this yearly output. In the face of this, the importations have steadily increased, and since 1885 there has been but one year, that of 1894, in which a large advance was not noted. In decorated goods especially has this excessive importation been most marked, the cheap female labor of the continent allowing the foreign manufacturer an advantage too great to overcome.

During all this time that the American potter had been in competition with the foreign manufacturer, the price of goods has steadily declined, and to-day \$100 will buy as much as \$160 would have bought before protection, as given by the gold premium, first permitted the establishment of extensive works in this country. Nor is the difference in price the only advantage gained; the character and quality of the product itself has improved to an almost incredible extent, and hundreds of thousands of dollars are saved every year to the consumer. The potters themselves

have undertaken a great work, and it is a noteworthy fact concerning their industry that the value of production cannot exceed to any extent the capital employed. Labor in the goods and the material leaves but a 10-per-cent margin, from which must come the profit and the wear and tear.

The statistics concerning the potteries as given in the United States census reports for 1880 are as follows: Number of establishments, 686; capital, \$6,380,610; production, \$7,943,229. Of these 686 potteries, only 55, according to private and reliable authority, were engaged in the manufacture of white ware, and only 4 of these devoted to the manufacture of porcelain or fine china.

The figures for 1890 are more comprehensive, embracing all manufactures of "clay and pottery." Under such classification the figures for 1880 would read: Number of establishments, 752; capital, \$7,366,323; production, \$8,977,333. For 1890 the same industries return as follows: Number of establishments, 707; capital, \$26,127,104; production, \$22,057,090. As already stated, 102 of these establishments are potteries proper, engaged in the making of wares for domestic purposes. The shrinkage in the number of establishments and increase of capitalization shown by the complete figures follows the course observed to have been taken by so many industries during the decade, and is the result of concentration and the closing of many of the smaller shops. In the pottery industry there is one great trust operating to-day, but it confines itself largely to sanitary ware, and the industry as a whole still remains in the hands of individual concerns.

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POTTO. See LEMUR, Vol. XIV, p. 443.

POTT'S DISEASE OF THE SPINE, a vertebral disease first described by Dr. Percival Pott (q. v., in these Supplements). It is otherwise known as "spinal caries." In this disease inflammation of the vertebræ and adjoining cartilages is followed by partial and sometimes total paralysis of the lower extremities. Tubercles form upon the diseased parts, and disintegration of the vertebræ results. Spinous processes project visibly beyond the rest, and form a curvature or hump such as is seen in some hunchbacks. Abscesses are formed, and in some instances the pus permeates the adjacent muscles. The treatment of a person suffering from this disease is the application of counteracting blisters and keeping the patient quiet, usually in a horizontal position. The disease is more often seen in young persons than in adults.

POTTSTOWN, a borough of Pennsylvania. It is in an agricultural and mining region, and has grown much in manufacturing importance, having numerous steel and iron mills and factories. There are also in and about the borough 20 creameries. Population in 1890, 13,285. See POTTSTOWN, Vol. XIX, p. 643.

POTTSVILLE, a city of Pennsylvania. Its more recently established industries include stove

foundries, boiler and engine shops, bolt and nut, stocking and woolen factories and bridge-works. It has excellent public schools, with a property valuation of \$300,000. It has libraries with 10,000 volumes, gas and water works, electric lights, and street-railways connecting with adjacent towns. Population 1890, 14,117. See also POTTSVILLE, Vol. XIX, p. 644.

POUCHED RAT OR GOPHER. See MAMMALIA, Vol. XV, p. 419.

POUGHKEEPSIE, a city of New York. The Hudson is here spanned by an important railroad bridge of masonry, steel and iron (finished in 1889); the structure rests on six piers—four in the channel—and is 3,094 feet in length, from anchorage to anchorage, or including the approaching viaducts, nearly 7,100 feet. Over three spans are cantilevers, with arms of 160 feet. Its industries lately established include a blast-furnace, rolling-mill, and silk, clothing and carriage factories. It has several libraries and numerous educational institutions. Vassar College (q.v.), Lyndon Hall (for girls, 195 pupils), Poughkeepsie Military Academy (35 pupils), Riverview Military Academy (160 pupils), Quincy School (co-educational, 55 pupils), and Eastman National Business College (over 950 students). It has numerous handsome buildings, including some fine residences, and is supplied with an excellent water system, sewers and street-lights. Population 1890, 22,206. See also POUGHKEEPSIE, Vol. XIX, p. 644.

POULTNEY, a town of Rutland County, Vermont, 14 miles W.S.W. of Rutland, on the Delaware and Hudson railroad, and on the Poultny River. The surrounding country is well adapted for pasturage, and is diversified with numerous picturesque lakes and forests of oak, sugar-maple, pine, beech and elm trees. It contains quarries and manufactories of slate, and several foundries, a machine-shop and mills. Population 1890, 3,031.

POULTON, EDWARD BAGNALL, a British zoölogist; born in Reading, England, Jan. 27, 1856. He was graduated at Oxford in 1876, and was a demonstrator of biology in the University Museum laboratory. He was lecturer in natural science in Keble and Jesus Colleges, Oxford, from 1880 to 1889, and in 1893 became professor of zoölogy in the Hope professorship, Oxford. He published a large number of treatises, among them *The Colors of Animals, Their Meaning and Use* (1890), and *Mimicry in the Animal Kingdom* (1890).

POULTRY AND EGGS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

POUND-NET, a net used in fishing, the half of which is set in the form of a square inclosure similar to the pound or municipal corral for strayed animals in use in some American towns. The net proper is a long, straight stretch which leads the fish into the pound, and which is called the leader. These leaders vary in length from 500 to 1,500 feet, and are set with one end attached

to the shore and the pound out in the deeper water.

POUND STERLING. See DECIMAL COINAGE, Vol. VII, p. 20; and MONEY, Vol. XVI, pp. 730, 734.

POURTALES, LOUIS FRANÇOIS DE, COUNT, a Swiss-American naturalist; born in Neuchâtel, Switzerland, March 4, 1824. He accompanied Louis Agassiz to America, and served in the United States Coast Survey as civil engineer. By his papers on the Gulf Stream and the Caribbean Sea he obtained a high reputation as a hydrographer. He made a special study of deep-sea zoölogy, and was with the Hassler expedition; and was for a time director of the tidal division of the United States Geological Survey. He was associated with Agassiz in the study of natural history, and succeeded him in 1873 as custodian of the Museum of Comparative Zoölogy, Cambridge, Massachusetts. He published, in addition to various government reports, *Fauna of the Gulf Stream at Great Depths* (1868); *Corals and Crinoids* (1878); and *Report on the Corals and Antipatharia* (1880). He died in Beverly, Massachusetts, July 19, 1880.

POUYER-QUERTIER, AUGUSTIN THOMAS, a French statesman; born Sept. 3, 1820, in Eloutteville-en-Caux. He engaged in manufacturing, and acquired wealth. He was a member of the Corps Legislatif in 1857-63; president of the Conseil General, of the Rouen Chamber of Commerce, and a director of the Bank of France. He was elected to the Chamber of Deputies in 1869, and was made Minister of Finance. The Alsace-Lorraine negotiations were in his charge, and to him belongs the credit of the placing of the first loan of \$500,000,000 in 1871. He was chosen an officer of the Legion of Honor and a member of the Senate.

POWDERLY, TERENCE VINCENT, an American labor-organizer, born in Carbondale, Pennsylvania, Jan. 22, 1849. At the age of 12 he began tending switch on the Delaware and Hudson River railroad, and at 19 years of age was at Scranton working in a machine-shop. He became secretary of the Machinists' and Blacksmiths' Union there, and remained so till 1880. In 1874 he was a delegate to the International Union at Louisville, Kentucky. Returning to Scranton, he joined the Knights of Labor, and was made secretary of the district assembly. He was then foreman in locomotive works. In 1877 he was elected mayor of Scranton, and re-elected in 1878. In 1879 the Knights of Labor at their convention in Chicago elected him as General Master Workman; in 1893 he was succeeded by James R. Sovereign. Mr. Powderly urged upon the Knights of Labor the abolition of the oaths and the removal of the obligation of secrecy, which demand was finally acceded to. Was appointed Commissioner General of Immigration in 1897 by President McKinley.

POWELL, JOHN WESLEY, an American geologist; born March 24, 1834, in Mount Morris, New York. He obtained his education at Oberlin and other colleges, and during his college life en-

gaged in scientific work, making collecting expeditions, etc. During the Civil War he served in



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the Union army, and attained the rank of lieutenant-colonel, losing an arm in the battle of Shiloh. At the close of the war, in 1865, he became professor of geology in the Iowa Wesleyan University, and in a short time took a similar position in the Illinois Normal University. In 1868, after a preliminary expedition the year before, he explored the Colorado River, floating through the Grand Cañon.

This exploit placed him at the head of the Government Survey of the West, organized at his suggestion. When this survey was consolidated into the United States Geological Survey and the Bureau of Ethnology created, Powell was placed at the head of the latter. Clarence King, the director of the United States Survey, resigned in 1881 and Powell succeeded to the position. Poor health compelled his resignation in 1894 from the Geological Survey, but he retained the directorship of the Bureau of Ethnology. His reports to the government are highly valued. Among them are *Exploration of the Colorado River* (1875); *Report on the Arid Region of the United States* (1879); and *Introduction to the Study of Indian Languages* (1880).

POWER, TYRONE, an Irish actor; born in Kilmathomas, Ireland, Nov. 2, 1797. He began his professional life in 1815, but after three years retired. Reverses in fortune compelled him to again seek the stage, where he became successful in Irish character delineation. He was in the United States in 1833-35 and in 1839-41. Upon his return voyage, in March, 1841, the ship he was on, the *President*, foundered, and all on board were lost. His favorite plays were *The Nervous Man* and *Man of Nerve* and *Rory O'More*. He was the author of *Impressions of America* (1835) and other works.

POWER OF ATTORNEY. See ATTORNEY, Vol. III, p. 62.

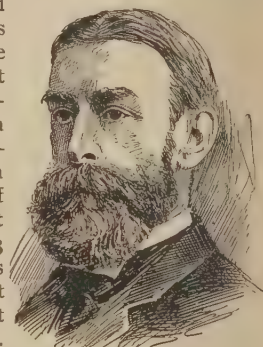
POWHATAN (1550-1618). See SMITH, Vol. XXII, p. 175.

POWNAL, a village of Bennington County, southwestern Vermont, on the Hoosac River, and on the Fitchburg railroad, nine miles S. of Bennington. It contains the Rural Home School for boys, and a manufactory of cotton and woolen goods. In the township is the hamlet of North Pownal. Population of township 1890, 1,919.

POWNALL, THOMAS, a Massachusetts colonial governor; born in Lincoln, England, in 1720. In 1753 he accompanied Sir Danvers Osborn, governor of New York, as private secretary; in 1755-56 was lieutenant-governor of New Jersey; and in 1756-58 governor of Massachusetts. He returned to England in 1760, and became a member of Parliament. He was an opponent of the Stamp

Act, and favored an early peace with the American colonies. He retired from public life in 1780. He published a number of works which were widely read on account of the intimate knowledge of their author of his subject. Among them are *The Administration of the Colonies* (1764); *Description of the Middle States of America* (1776); and *State of Affairs Between the Old and New World* (1780). He died in Bath, Feb. 26, 1805.

POYNTER, EDWARD JOHN, a British artist; born in Paris, March 20, 1836; the son of Ambrose Poynter, the architect, and great-grandson of Thomas Banks, R.A., sculptor. He received his education at Westminster school, Brighton College, and Ipswich grammar-school; and studied art in the English schools. On account of delicate health he was sent for the winter of 1852-53 to Madeira, and it was during his stay there that he developed an earnest desire to become an artist. Next winter he was in Rome, where he made the friendship of Frederick Leighton, the future president of the Royal Academy, and who shared his studio in Rome with the young enthusiast. In 1856 Poynter went to Paris, where he studied at l'École des Beaux-Arts, and under Gleyre. In 1859 he exhibited at the British Institution his two Italian *Pifferari*. In 1860 he returned to London, and the following year exhibited at the Royal Academy *Alla Veneziana*. Some of his early work in London consisted of making illustrations for *Once a Week*, and for Dalziel's projected *Illustrated Bible*. During his work on the latter he made a careful study of Egyptian art, and, as a result, produced in 1864 his *Israel in Egypt*, the same year exhibiting at the Academy *The Siren*.



EDWARD J. POYNTER.

In 1869 he was made an associate of the Academy; in 1871, Slade professor of art in University College, London; member of the Belgian Water-Color Society (1871). In 1876 he was elected a full Academician, his diploma work being *The Fortune-Teller*. In the same year he was appointed director for art, and principal of the training-schools at South Kensington, which positions he resigned in 1881, but retained his connection with the department as visitor of the training-schools. In 1883 he was elected a member of the Royal Water-Color Society. He exhibited his *Diadumene* at the Academy in 1885, his picture giving rise to a very lively discussion as to the nude in art, during the season. In 1894 he was appointed director of the National Gallery, succeeding Sir F. Burton. In 1896 there was great interest manifested in the selection of a president to fill the place left vacant by Sir John Millais, who was able to enjoy for but a brief period the honor bestowed upon him by his fellow-members on the lamented death of Lord Leighton. Early in October, the honor was awarded to Mr. Poynter, who, it

was understood, was the Queen's favorite for the place. He was invested with the customary chain of office and knighted at Windsor, Nov. 26, 1896. Among the works of the president not already mentioned are *Faithful unto Death* (1865); *Offerings to Isis* (1866); *The Catapult* (1868); *The Prodigal Son* (1869); *Proserpine* (1869); *Andromeda* (1870); *The Suppliant to Venus* and *The Ibis Girl* (1871); *Perseus and Andromeda* (1872); *More of More Hall and The Dragon of Wantling and Rhodope* (1874); *The Festival and The Golden Age* (1875); *Atalanta's Race*; *Zenobia*; and *Cecil Wedgwood* (1876); *Zenobia Captive* (1878); *Nausicaa and Her Maidens* (1879); *The Ides of March* (1883); *Outward Bound* (1886); *A Corner of the Market-Place* (1887); *Under the Sea Wall* (1888); *A Corner in the Villa* (1889); *Pea Blossom* and *On the Temple Steps* (1890); *The Meeting of Solomon and the Queen of Sheba* (1891); *When the World Was Young* (1892); *Chloe* (1893); and *Horæ Serenæ and Idle Fears* (1894). Among his portraits are those of *Mrs. Langtry* (1878); *Lord Ripon* (1886); *Sir Gerald Graham* (1886); and *Earl of Harwood* (1888). His other work exhibits a varied genius. When he settled in London he made numerous designs for stained-glass windows. In 1869 he painted seventy cartoons for the mosaic of St. George, Westminster; designed the architectural and tile decorations for the grill-room at South Kensington (1868-70); painted a fresco at St. Stephen's Church, Dulwich (1872-73); made two designs for the decoration of the dome of St. Paul's, and cartoons, full size, for one portion of the same dome (1882-84); designed the border of the Queen's letter to the nation after the death of the Duke of Clarence; and made two sets of designs for the Jubilee coinage, his accepted designs being for the reverse side of the coins. His water-color works are numerous. He published *Ten Lectures on Art* in 1879.

POZZUOLANA. See BUILDING, Vol. IV, p. 459.

PRADON, NICOLAS, a French dramatist (1632-1698). See RACINE, Vol. XX, p. 207.

PRAED, MRS. CAMPBELL MACKWORTH, a British novelist; pseudonym and maiden name Rosa Murray-Prior; born in Queensland, March 27, 1852. She was married in 1872 to Campbell Mackworth Praed, nephew of the poet W. M. Praed. She wrote a number of novels and dramas, and in collaboration with Justin McCarthy a number of novels. Among the latter are *The Right Honorable* (1886); *The Rebel Rose* (1888); and *Christina Chard* (1894). Among her individual works are *An Australian Heroine* (1880); *Moloch* (1883); and *The Romance of a Station* (1890).

PRAIRIE-DOG. See MARMOT, Vol. XV, p. 560.

PRAIRIE DU CHIEN, a city and the capital of Crawford County, southwestern Wisconsin, 54 miles S. of La Crosse, on the Chicago, Burlington and Northern and the Chicago, Milwaukee and St. Paul railroads, and on the Mississippi River. It has a machine-shop, a flouring-mill, a large saw-mill, an oil-mill and two plow factories; also St. John's College (Roman Catholic) and a high-school. Population 1890, 3,131; 1895, 3,878.

PRAIRIE-HEN. See GROUSE, Vol. XI, p. 223.

PRAIRIES, the name given by the early French settlers in America to extensive tracts of land, either level or rolling, destitute of trees, and covered with coarse grass. The district to which the term is commonly applied embraces the Mississippi Valley from Texas to British Columbia and from Illinois to the Rocky Mountains. See *Mississippi Basin*, under UNITED STATES, Vol. XXIII, p. 792.

PRAIRIE-SQUIRREL, the popular name applied in the United States to any species of *Spermophilus*. They are often called ground-squirrels, but this name is usually given to members of the genus *Tamias*, which includes the chipmunks. The prairie-squirrels are terrestrial, not arboreal, and live in burrows. Owing to similar habits, they are confused with the gophers (*Geomyridæ*). About a dozen species of *Spermophilus* are found in the United States.

PRAIRIE-WOLF OR COYOTE (*Canis latrans*), a small wolf common on the Western plains of North America. The other American species of wolf is *C. lupus*. This is apparently identical with the Old World form, and the numerous species, formerly regarded distinct, are now by many authorities considered local varieties. See WOLF, Vol. XXIV, p. 628.

PRATINAS. See DRAMA, Vol. VII, p. 404.

PRATT, CHARLES, an American merchant and philanthropist; born in Watertown, Massachusetts, Oct. 2, 1830. He acquired wealth in the oil and paint trade in New York City, and was one of the organizers and principal stockholders of the Standard Oil Company. He was for years



PRATT INSTITUTE.

a benefactor of Adelphi Academy, Brooklyn, and in 1886 founded and richly endowed the Pratt Industrial Institute of Brooklyn. The Pratt Institute combines academic, business and manual training. Included in the industrial training are carpentry, blacksmithing, housekeeping, cooking, and training for skilled trades of all kinds. In 1895 there were 3,195 students in attendance, 115 in the faculty, and the institution possessed

a library of over 50,000 volumes. The endowment received from Mr. Pratt was \$2,500,000. He died in New York City, May 4, 1891.

PRATT, ENOCH, an American philanthropist; born in North Middleboro, Massachusetts, Sept.



PRATT LIBRARY, BALTIMORE.

10, 1808. He was educated in the public schools and at the Bridgewater Academy, whence he graduated at the age of 15, and began a business career in Boston. In 1831 he established himself in Baltimore. His deep and practical interest in charitable and educational enterprises found expression in the House of Reformation and Instruction for colored children, at Cheltenham, to which he gave 750 acres of land, and the Maryland School for the Deaf and Dumb, at Frederick, of both of which he was the founder. He endowed an academy in his native town of North Middleboro in 1867, giving \$30,000 for the purpose, and in January, 1882, announced his intention of presenting to Baltimore his greatest gift to education, the library which bears his name. The building and its four branches were conveyed to the city July 2, 1883. The money value of building and endowment amounted to \$1,083,333. The first books were purchased in 1885, and the library opened to the public in 1886. Four branch libraries were opened in 1886, one in 1888, and the sixth in 1896. Oct. 1, 1896, there were 170,000 volumes. He died in Tivoli, Baltimore County, Maryland, Sept. 17, 1896, leaving many philanthropic bequests in his will, and \$2,000,000 to the Shepherd Asylum, provided the name be changed to the Shepherd and Enoch Pratt Hospital.

PRATT, ORSON, an American Mormon apostle; born in Hartford, New York, Sept. 19, 1811.

He became a Mormon in 1830, and from that time until his death was a leader in the sect. He was sent to Europe nine times, and was constantly engaged in missionary work. He was the first to visit Salt Lake, and was one of the two apostles who located Salt Lake City. He took an active part in the territorial politics; gave a portion of his time to Deseret University as professor of mathematics, and published a number of books. Among his writings are *Divine Authenticity of the Book of Mormon*; *Patriarchal Order, or Plurality of Wives* (1853); and *Cubic and Biquadratic Equations* (1866). He died in Salt Lake City, Oct. 3, 1881.—His brother, PARLEY PARKER, also a Mormon apostle; was born in Burlington, New York, April 12, 1807. He became a member of the Mormon Church in 1830, and, like his brother, was chosen one of the 12 apostles. He was sent to England in 1840, and again later. He was engaged in missionary labors in all parts of the United States, and was a member of the exploring parties in Utah in 1847 and 1849. He published numerous pamphlets and several books. Among the latter are *History of the Persecutions in Missouri* (1839); and *Key to the Science of Theology* (1854). He was assassinated May 13, 1857, near Van Buren, Arkansas, while on a proselyting tour.

PRAWN. See CRUSTACEA, Vol. VI, p. 645.

PRAYER, THE BOOK OF COMMON. See ENGLAND, Vol. VIII, p. 338.

PREBLE, EDWARD, an American naval officer; born in Portland, Maine, Aug. 15, 1761. He entered the American navy in 1778; was taken prisoner in 1779, but was released in time to render valuable aid in the *Winthrop*. He was commissioned a lieutenant in 1798, and captain in 1799. He commanded the *Essex* in a cruise to China, and in 1803 was sent in the *Constitution* to command the expedition against the Barbary states. He compelled the Sultan of Morocco to accede to the demands of the United States, and in 1804 attacked Tripoli. He was so successful in his attacks that the Pasha sued for peace, and signed a treaty with Commodore Barron, Preble's successor, in which he renounced all demands for tribute, and liberated the captives held by him. Preble was relieved by Barron, Sept. 10, 1804, and upon his return to the United States was given a vote of thanks by Congress. He died in Portland, Aug. 25, 1807.

PREBLE, GEORGE HENRY, an American naval officer and writer; born in Portland, Maine, Feb. 25, 1816. He entered the navy as a midshipman in 1835; served in the Florida and Mexican wars; commanded the *Katahdin* and the *St. Louis* during the Civil War. He was dismissed from the service in 1862 for failing to capture the blockade-runner *Florida*, but was afterward reinstated; was promoted to captain in 1867, commodore in 1871, rear-admiral in 1876, and was retired in 1878. His principal works are *History of the Flag of the United States of America*, *Naval and Yacht Club Signals* (1872) and *First Cruise of the United States Frigate "Essex"* (1870).

PRECEDENTS. See COMMON LAW, Vol. VI, p. 208; LAW, Vol. XIV, p. 365; also, ROMAN LAW, Vol. XX, p. 698.

PRECESSION OF THE EQUINOXES. See ASTRONOMY, Vol. II, p. 794.

PRÉCIEUSES. See RAMBOUILLET, Vol. XX, p. 264.

PREECE, WILLIAM HENRY, a British electrical engineer; born in Carnarvon, North Wales, Feb. 15, 1834. He attended King's College, London; engaged in electrical work in 1852 in the telegraph service of the Electric and International Telegraph Company, and afterward held positions of importance in that and other companies. When the telegraphs became government property in 1870 he was retained as divisional engineer; became chief electrician in 1877 and engineer-in-chief in 1892. He published a number of papers on electricity, and with Sir James Sivewright, a *Text-book of Telegraphy*.

PRE-EMPTION, in law. See HOMESTEAD, Vol. XII, p. 122; and SALE, Vol. XXI, p. 209.

PREFECT. See PRÆFECT, Vol. XIX, p. 652.

PREJEVALSKY, NICOLAI MICHAELOVITCH, a Russian explorer; born in Smolensk, Russia, March 31, 1839. He entered the Russian army in 1855, and took part in quelling the Polish insurrection of 1861. He was sent on staff duty to Siberia in 1867, and from that time until his death devoted the greater part of his time to travel in Asia in the Amur and Yang-tsze-Kiang valleys. He rediscovered Lobnor in East Turkestan. His ambition was to reach Lhasa, Tibet, and he made three unsuccessful attempts to reach that point, but was each time turned back by the Tibetan authorities. He died at Karakol, West Turkestan, Nov. 1, 1888, while starting on a fourth attempt. The reports of his various expeditions are preserved in the *Proceedings of the St. Petersburg Geographical Society*.

PREMIUM. See INSURANCE, Vol. XIII, p. 162.

PREMONSTRATENSIAN. See ABBEY, Vol. I, p. 20.

PRENDERGAST, SIR HARRY NORTH DALRYMPLE, a British soldier; born October 15, 1834. He served in Persia in 1857, in Central India, in Abyssinia, and was aide-de-camp to Lord Ripon while the latter was viceroy of India. He was placed in command of the expedition to Upper Burma against Theebaw in 1885, and compelled the surrender of Mandalay. He was knighted in 1885, and after that date was in command in Burma and other Indian districts.

PRENTICE, GEORGE DENISON, an American journalist; born in Preston, Connecticut, Dec. 18, 1802. After his graduation at Brown University in 1823, he studied law and was admitted to the bar in 1829. He did not practice, however, but engaged in journalism. He was long known as editor of the *Louisville Journal*, and as an incisive and witty writer. He favored the Union cause, and supported it throughout the war. Among his writings in book form are *Life of Henry Clay* (1831) and *Prenticeana; or, Wit and Humor*

(1859). He died in Louisville, Kentucky, Jan. 22, 1870.

PRENTISS, GEORGE LEWIS, a Presbyterian clergyman, brother of Sergeant S. Prentiss; born in Gorham, Maine, May 12, 1816. He was graduated at Bowdoin in 1835, and afterward spent two years in Germany at Halle and Göttingen. In 1845 he served as pastor in New Bedford, Massachusetts, and from 1851 to 1873 was in New York City, first at the Mercer Street church and later at the Church of the Covenant. He was appointed professor of pastoral theology in Union Seminary in 1873. He published *Thomas Harvey Skinner* (1871) and *Life of Elizabeth Prentiss* (1882).—ELIZABETH PAYSON, authoress, wife of the preceding; born in Portland, Maine, Oct. 26, 1818. She was married in 1845. Among her publications are *Little Susie Series* (1853-56); *The Home at Greylock* (1876); and *Stepping Heavenward* (1869). She died in Dorset, Vermont, Aug. 13, 1878.

PRENTISS, SERGEANT SMITH, an American orator; born in Portland, Maine, Sept. 30, 1808. He was educated at Bowdoin College, where he graduated in 1826. The next year he emigrated to Mississippi, and at once became the idol of the people of that state. He was sent repeatedly to the state legislature, and in 1837 he was elected to Congress, but the seat was contested by Colonel Claiborne. This gave rise to the celebrated investigation in which Prentiss defended his claims in a speech before the House of three days' duration, the effect of which was to materially enhance his reputation and give him more than a local fame. His claim was rejected by the casting vote of the speaker, and on his return to his constituency he was re-elected by an overwhelming majority. He was the beau-ideal of Southern chivalry, and his social qualifications made him the object of the affections of all with whom he came in contact. Two of his most noted orations were one delivered in Boston, in Fanueil Hall, on the occasion of a dinner given in honor of Daniel Webster, and another made before a Kentucky court in a successful defense of Judge Wilkinson, his friend, who was charged with murder. In 1845 he left Mississippi for Louisiana because the former state had in his mind forever disgraced itself by the repudiation of its bonded indebtedness. He died in Longwood, Mississippi, July 1, 1850.

PRE-RAPHAELITES. See ROSSETTI, Vol. XX, p. 857.

*PRESBYTERIANS IN AMERICA. The Presbyterian Church is one of the most powerful religious bodies in the Christian world. It is preëminently strong in the United States and Canada. (Information concerning its doctrines and government is to be found in the article, PRESBYTERIANISM, Vol. XIX, pp. 676-701.) Altogether there are 89 sects, which hold more or less completely the Presbyterian system of doctrine and mode of government. Of these, 18 are found in North America, and report themselves to THE ALLIANCE OF REFORMED CHURCHES HOLDING THE PRESBYTERIAN SYSTEM. These are

(1) the Presbyterian Church in Canada; (2) the Presbyterian Church of Canada in connection with the Church of Scotland; (3) the Synod of the Maritime Provinces in connection with the Church of Scotland; (4) the Presbyterian Church in the United States of America; (5) the Presbyterian Church in the United States (Southern); (6) the Cumberland Presbyterian Church; (7) the Cumberland Presbyterian Church (colored); (8) the Welsh Calvinistic Methodist (or Presbyterian) Church in the United States; (9) the United Presbyterian Church of North America; (10) Synod of the Associate Reformed Presbyterian Church of the South; (11) the Associate Reformed Presbyterian Church of North America; (12) General Synod of the Reformed Pres-

byterian Church for the ministry, 4,795,216 communicant members, 32,271 Sabbath schools, and 3,653,925 Sunday-school officers, teachers and pupils. For the support of work at home the contributions for 1895 were \$31,521,150, and for foreign missions, \$2,375,310. There are reported altogether in the United States and Canada 20,398 congregations, 15,535 ministers, 68,729 ruling elders, 1,259 licentiates, 3,296 students in preparation for the gospel ministry, 2,170,517 communicant members, 18,480 Sunday-schools and 2,067,097 Sunday-school officers, teachers and pupils; and for self-support \$19,625,315 was contributed by the people.

Referring to Canada first, there were six separate factions, which formed a general union there

CHURCHES.	NO. OF PRESBYTERIES, OR CLASSES.	CONGREGATIONS.	MINISTERS.	ORDAINED OFFICERS.	PROBATIONERS OR LICENTIATES.	STUDENTS.	COMMUNICANT CHURCH MEMBERS.	SABBATH SCHOOLS.	SABBATH-SCHOOL OFFICERS, TEACHERS AND SCHOLARS.	CONTRIBUTIONS.	
										Self-Support and Home Work.	Foreign Missions.
(2) Synod of the Presbyterian Church in Canada, in connection with the Church of Scotland.....	1	5	61	57	---	---	1134	5	691	\$10,145	\$2,800
(3) Synod of the Maritime Provinces, in connection with the Church of Scotland.....	2	14	12	200	1	---	1000	12	550	---	---
(6) General Assembly of the Cumberland Presbyterian Church.....	126	2884	1704	16090	281	268	193393	1705	118163	No Re port.	
(7) General Assembly of the Cumberland Presbyterian Church (Colored).....	23	224	---	---	---	---	12956	---	---	No Re port.	
(8) General Assembly of the Welsh Calvinistic Methodist or Presbyterian Church in the United States.....	18	---	108	474	---	12	12285	---	13373	85,875	11,570
(9) General Assembly of the United Presbyterian Church of North America ---	64	790	864	3736	75	99	117706	1127	115344	1,361,545	86,175
(10) Synod of the Associate Reformed Presbyterian Church of the South ---	9	126	87	750	6	8	10640	98	8436	64,215	8,090
(11) Synod of the Associate Reformed Presbyterian Church of North America ---	---	---	---	---	---	---	---	---	---	No Re port.	
(12) General Synod of the Reformed Presbyterian Church in America ---	7	49	40	550	3	9	6200	49	3900	No Re port.	
(13) Synod of the Reformed Presbyterian Church in America ---	12	119	109	670	18	10	9787	45	11501	51,670	4,000
(14) The Reformed Presbyterian Church (Covenanted).....	---	3	---	---	---	---	37	---	---	---	---
(15) The Reformed Presbyterian Church in the United States and Canada.....	---	1	---	---	---	---	600	---	---	---	---
(16) General Synod of the Reformed Church in America ---	35	618	660	---	19	146	103346	874	117260	1,218,960	164,150
(17) Synod of the Christian Reformed Church in America ---	7	122	79	750	2	50	16500	110	21100	67,500	2,250
(18) General Synod of the Reformed Church in the United States.....	55	1636	961	---	---	304	226572	1643	190524	1,296,925	27,185

byterian Church in America; (13) Synod of the Reformed Presbyterian Church in America; (14) the Reformed Presbyterian Church (Covenanted); (15) the Reformed Presbyterian Church in the United States and Canada; (16) Reformed Church in America (formerly called Dutch); (17) Christian Reformed Church in America; (18) Reformed Church in the United States.

The above table gives a brief compendium of a part of the above-named branches.

According to the reports made to the Alliance of Reformed Churches Holding the Presbyterian System, at its meeting in Glasgow in 1896, there are in the 89 branches 1,426 presbyteries, 31,925 congregations, 27,043 ministers, 130,083 ruling elders, 2,666 licentiates, 5,019 students in prepara-

tion in 1875, calling it "The Presbyterian Church in Canada." This leaves but two minor denominations standing separate. The union has 53 presbyteries, 919 congregations, 1,077 ministers and 179,579 communicants; and has enjoyed not only peace but much prosperity in the new relation.

The second largest branch of the Presbyterian body in the United States is known as the Southern Church, the accurate title of which is *The Presbyterian Church in the United States*. It dates its organic life from December, 1861, where it was first entitled "*The Presbyterian Church in the Confederate States of America*." Its first General Assembly convened in Augusta, Georgia, with 93 ministers and ruling elders as commissioners, representing 47 presbyteries. There were no new articles of faith adopted,

and the standards of the church from which they parted were retained by a unanimous vote.

Presbyterians in the South stood then, as they do now, if anything, more four-square to the doctrinal positions of the body than do those in the North. It was mainly the issues of national life which divided the church. In the meeting of the General Assembly of the Presbyterian Church (Old School), at Philadelphia, May, 1861, a paper, offered by Rev. Dr. Gardiner Spring of the Brick Church, New York, was adopted, which proved to be the dividing wedge. It asserted that sovereignty resides in the people of the republic as a mass and not by states. This was not only esteemed erroneous and repugnant by men of the South, but, whether right or wrong as a contention, they considered it as transcending the sphere of her authority for the church to make such a deliverance. Having withdrawn and integrated themselves in the South they diligently addressed themselves to the propagation of Presbyterian doctrines and development. And after 1865, thoughts of peace began to pass between the church of the North and the church South. But obstacles of different kinds have recurrently arisen to bar the way to reunion. Meanwhile, the church South has made steady and, we may add, signal progress in view of all the circumstances. There are 13 synods; 76 presbyteries; 1,349 ministers; 85 licentiates; 402 students for the ministry; 2,788 churches and 8,656 ruling elders. In 1895, 11,874 new communicants were added on confession of faith, making the total membership 210,539. The officers, teachers and pupils in their Sunday-schools number 157,958, and \$1,856,515 passed through the treasuries of their churches as reported.

As noted, the article, PRESBYTERIANISM, above referred to in Vol. XIX, brings the history of the Northern church down to the period of the reunion of the Old and New School. The inception of that auspicious event came close after the war ended (in 1865) between the North and the South; but the earliest impulses toward it were felt during the war. The Old School Assembly, meeting in Columbus, Ohio, 1862, suggested an interchange of commissioners with the New School, to which, in due time, the New School responded, in resolutions, expressing great pleasure in such a fraternal act.

At last, in 1868, tangled questions which troubled the attempt at settlement were swept away by the proposal that reunion should be made upon the basis of the Standards, pure and simple, "leaving all other matters for re-adjustment after the reunion should take place." Naturally, there were some reluctant to follow, although acknowledged leaders in both bodies were generally agreed and eager to advance. Minister and layman of first rank on both sides took hold with high zeal; and the joint committee of the bodies making a report, the Old School Assembly adopted it by a vote of 285 to 9, and the New School Assembly voted unanimously to reunite on the basis as aforesaid. By prearrangement and in good hope both the Old and the New School Assembly met in May, 1869, at Pittsburg, Pennsylvania. Of the 144 Old School presbyteries, all but 13, and all of the 113 New

School presbyteries had voted in favor of the consummation so devoutly wished. Every act essential to a cession of the individual existence of the two was performed. Then each assembly formally adjourned to meet in Philadelphia in May of the following year. And they did meet together in the same church, where, at the disruption which occurred in 1838, the New School gathered to begin its separate life. From that result immeasurable benefits have flowed, and the statistical facts of growth are very great, so that in 1896 there were 31 synods, 224 presbyteries, 6,942 ministers, 455 licentiates, 176 local evangelists, 1,508 candidates for the ministry, 7,573 churches, 36,199 ordained lay officers. In 1895 there were 64,806 added to the churches on confession of faith, and 38,489 on certificate, making the entire communicant roll 943,716. Denominational and local church expense account aggregated \$11,283,975. For home missions, \$980,556; foreign missions, \$739,103; education, \$102,367; Sunday-schools, \$130,598; church erection, \$155,177; relief of disabled ministers, \$94,353; freedmen, \$109,205; other objects, \$554,143. The total offering to all the treasuries reporting is \$14,149,477. Of this a notable share of strength and service is found in the Sunday-schools of the church, their contributions amounting to \$706,693. The schools number 7,872; teachers and officers, 114,822, and pupils, 955,364.

In 1887 the assembly appointed a committee on church unity to confer with a commission, created by the Protestant Episcopal Church at the general convention in Chicago in 1886, concerning certain propositions presented by this body as a basis for the restoration of the organic unity of the church. Readiness to co-operate in the movement, whose motive was to discountenance schism and to heal the unhappy divisions in Christendom, was expressed by this committee in its correspondence with the commission; and earnest efforts were made to come to an agreement. The correspondence was, however, suspended in May, 1896, without any practical conclusion having been reached, with an expression of hope that the time might soon come when it may be reopened by the acceptancy, on the part of the commission for its church, of the doctrine of "mutual recognition and reciprocity."

In the year 1860 Mrs. Mason, returning to America from India, was, while stopping at Calcutta, moved to deep sympathy for the Zenana women of India. Her eloquent appeal on their behalf resulted in the organization of the Women's Union Missionary Society. The Woman's Board of Missions was organized in 1868 in Boston to co-operate with the American Board (Congregationalist), and on Oct. 4, 1870, the Woman's Foreign Missionary Society of the Presbyterian Church was fully organized in Philadelphia. This was followed by the organization of six other woman's boards in New York City, in Chicago, in St. Louis, in San Francisco, in Portland, Oregon, and in northern New York. The gifts from the woman's boards from 1885 to 1895 amounted to over three millions of dollars.

Once the women were embarked in the enter-

prise of foreign missions, others became concerned to do a part in home-missionary work through a society of their own. As a consequence the woman's executive committee in New York was organized in 1878; and their fields of labor are in Alaska, Mexico, Utah and among the mountain whites of the South. By the schools and missions which they have started and supported among these neglected peoples great results have been achieved. According to the report of 1896 they have 118 schools and missions, 378 teachers, 9,326 pupils, and their contributions were \$314,941.

In the year 1883, in the city of Portland, Maine, the Young People's Christian Endeavor Society was started in the Williston Church. It was begun by the Congregationalists of New England. But very soon its excellences and advantages were apparent to young people of the Presbyterian churches, and it became a favorite. Hence the number of local Christian Endeavor societies in Presbyterian churches—over seven thousand, junior and senior both counted—the largest of any denomination. In the years 1894-95 some stir was made in one section of the country in the interest of a movement to denominationalize these societies, it being thought that young people of the Presbyterian Church should be organized more closely with the body. The General Assembly, meeting in Pittsburg, May, 1895, appointed a large and influential committee to consider the subject and report to the next assembly. When this committee reported to the assembly in Saratoga in 1896 there was a decided disapproval, judged by the votes against the report, so as to indicate that the church favors the *status quo*, and would not consider a more stringent church control of the young people's societies.

In the year 1889, 15 presbyteries overtured the General Assembly to provide for some revision of the Confession of Faith. In response the assembly of 1890 sent down two questions to be answered by the next assembly, of 1891:

1. Do you desire a revision of the Confession of Faith?

2. If so, in what respects and to what extent?

Responses came from all but four presbyteries and these were in foreign missionary fields. The main vote stood 68 nays and 134 yeas, 92 of these specifying their desire that the system of doctrine should not be impaired. A committee on revision was then appointed, consisting of 15 ministers and 10 elders, and instructed not to "propose any alterations or amendments that will, in any way, impair the integrity of the Reformed or Calvinistic system of doctrine taught in the Confession of Faith." At the next assembly, meeting in Detroit, the committee reported progress, and recommended that the changes, which they proposed, should be sent down to the presbyteries for consideration, criticism or amendment. The final report was made the next year (1892) at Portland, and sent down to the presbyteries for their enacting approval. Two thirds of all the presbyteries was necessary to enact, and it was not given for any part of the report. Thus, after four years of diligent study and discussion, the mature judgment of the entire church was re-

corded against any change in her confessional basis of faith.

Few churches in Christendom give more generously for the support of undenominational institutions for the propagation of the Gospel, such as the American Tract Society, the American Sunday-School Union and the American Bible Society. No other church requires less of subscription to confessional standards in order to membership. Thus it has been, and is, that among her ministry there may be found, here and there, one concerning whose orthodoxy common fame reports disparagingly; and yet, from year to year, no complaint is made to the courts of the church. A famous case which terminated otherwise was that of Professor Charles Augustus Briggs, D.D., of New York. For a discussion of this case, see BRIGGS, CHARLES AUGUSTUS, and UNION THEOLOGICAL SEMINARY, in these Supplements.

Very naturally, these events connected with the trial of Dr. Briggs awakened attention to the relation of the theological seminaries to the General Assembly, of which seminaries there are 14.

Previous to reunion (1870), the theological seminaries had been organized differently—some by the General Assembly, some were under control of the synods, and some were close corporations. Union Seminary belonged to the last class. At reunion an effort was made to secure a uniform relation of the seminaries to the assembly, so far as to clothe that supreme court with power to approve or disapprove appointments made by the boards of control in the seminaries. No appointment to a professorial chair should be considered complete if disapproved by a majority vote of the assembly. But in this compact of 1870, there was no legal basis laid for enforcing its sanctions. This, in connection with the Briggs controversy, led to the appointment of a committee of 15, by the assembly of 1892, to "take into consideration the whole subject of the relation of the assembly to its theological seminaries, to confer with the directors of these seminaries and report to the next General Assembly such action as, in their judgment, will result in a still closer relation between the assembly and its seminaries." The work of this committee was continued through four years, and secured what they desired from some of the seminaries. With others they failed, and the assembly, discharging the committee in 1896, committed to the boards of control of the seminaries the matter of so securing and safeguarding these institutions to the church that no danger of defection or diversion of funds or property from the church can occur.

JOHN LINDSAY WITHROW.

PRESCOTT, a city and the capital of Yavapai County, central Arizona, in an amphitheater made by inclosing mountain-ranges; 78 miles N. of Phoenix, on the Santa Fé, Prescott and Phoenix branch of the Atlantic and Pacific railroad. It is at a considerable elevation above the sea, and its climate is considered beneficial to invalids. A large business is done here in lumber, wool and bullion. The town is the trade-center of a large gold and silver mining region; also of a farming district. This is one of the most

important towns in Arizona. Population 1890, 1,759.

PRESCOTT, a town and the capital of Nevada County, southwestern Arkansas, 5 miles S.W. of the Antoine Creek river and 31 miles S.W. of Arkadelphia, on the Prescott and Northwestern and the St. Louis, Iron Mountain and Southern railroads; an important cotton-shipping point; ships also livestock, lumber, wool and furs. Population 1890, 1,287.

PRESCOTT, WILLIAM, an American Revolutionary officer; born in Groton, Massachusetts, Feb. 20, 1726. He served against the Acadians in 1756; was commander of a company of minute-men, but did not reach Lexington in time to take part in the fighting. He was assigned the duty of fortifying Bunker Hill in 1775, and was virtually in command of the Americans in the battle which followed. He was with Gates at Saratoga, and was a member of the Massachusetts legislature. A statue was erected to his memory on Bunker Hill in 1881. He died in Pepperell, Massachusetts, Oct. 13, 1795.—OLIVER, brother of William, also a soldier; born in Groton, Massachusetts, April 27, 1731. He was a physician by profession, but always took an active part in colonial military affairs. He was major-general of the Massachusetts militia in 1781, and was prominent in the suppression of Shay's rebellion. He died in Groton, Nov. 17, 1804.—WILLIAM, lawyer, son of William, preceding; born in Pepperell, Massachusetts, Aug. 19, 1762. After graduation at Harvard in 1783, he studied law and was admitted to the bar of Massachusetts in 1787. He was a state senator in 1806 and in 1813, and held important municipal offices in Boston. He died in Boston, Dec. 8, 1844.

PRESENTMENT, in criminal law, the formal act by which a grand jury makes an accusation of crime or draws attention to a public evil. No consequence is to ensue unless an indictment is framed and a true bill formally returned thereon. See GRAND JURY, in these Supplements.

PRESERVES. See JAMS AND JELLIES, Vol. XIII, p. 564.

PRESIDENT, in the United States. See UNITED STATES, Vol. XXIII, p. 748; and, for method of election, ELECTORS, in these Supplements.

PRESQUE ISLE, a town of Aroostook County, northeastern Maine, 42 miles N. W. of Houlton, on the Bangor and Aroostook and the Canadian Pacific railroads, and on the Aroostook River. The greater portion of the surrounding country is hilly, and is covered with large forests of sugar-maple. Only in a few parts is the soil fertile, and the winters are extremely severe. Its chief products are oats, hay, potatoes, butter and lumber. Here is located Presque Isle Academy, a starch factory and several sawmills. Population 1890, 3,046.

PRESS, PRINTING. See TYPOGRAPHY, Vol. XXIII, pp. 704-708; and PRINTING-PRESSES, in these Supplements.

PRESSENSÉ, EDMOND DEHOULT DE, a French Protestant clergyman and senator; born in Paris, Jan. 7, 1824. He studied in Paris, Lausanne, Halle and Berlin. On his return to Paris he was ap-

pointed pastor of the Taitbout Chapel, where he soon gained a high reputation as a preacher. He sat in the chamber of deputies, representing the department of the Seine, from July, 1871, until the close of the year 1875, and was elected a life-senator in 1883. He published many works, some of which have been translated into English. Among his publications are *Application of Christianity to Social Problems* (1849); *Catholicism in France* (1851); *Religious Liberty in Europe* (1870); and *Life of Jesus* (1884). He died in Paris, April 8, 1891.—His wife ELISE, authoress, was born in Switzerland, in 1826. She was the daughter of a Swiss littérateur, Du Plessis. She began her active literary work in 1858, when she published *Rosa*. This was followed by a series of books for children and several novels, of which *Sabine* and *Genevieve* are the best known. Mme. Pressensé was active in philanthropic work, and established schools in the poorer districts of Paris.

PRESSES. The use of presses for forming metal, punching, stamping, cutting, shearing, embossing, coining, and a great variety of other operations, has increased enormously within a score of years. The manufacture of great numbers of similar machines, having duplicate small parts, has rendered necessary the use of presses which would perform these operations in an economical manner. They are used in hundreds of different trades, and their number is continually increasing, while new styles and forms appear on the market with continual regularity. The same presses are often used for widely different purposes. Yet in many trades, special presses have to be built to suit the work. A firm that builds over 300 styles of presses advertises 13 forms suitable for use in making parts of bicycles and 15 for use in building typewriters.

The heaviest forms of presses are used in the great steel-mills, where enormous pressures are sometimes required. These are usually operated by hydraulic power, and many of them are doing work formerly done by the steam-hammer.

Presses for cutting tin, for use in forming cans, boxes, etc., are commonly made so that the bed may be inclined at any convenient angle. The cutting is done with dies, one being placed on the bed and its opposite in the ram. Heavy fly-wheels are used to secure a steady motion. Many of these machines have holes through the beds for dropping the blanks cut or punched out. Feed-roll attachments are made for work cut from continuous strips or sheets of metal. Slide-feeds and reel-feeds are both used. Automatic push-outs of various forms are also made, and knock-outs for work that adheres to the dies.

Coining-presses are made for stamping coins, medals, etc., and for embossing name-plates, badges and the like. The ornamental work on watch-cases and many kinds of jewelry is also stamped by the coining-press. The government machines used in the mints are usually very powerful, being operated by hydrostatic pressure, but for commercial work lighter machines are used; and a description of one form of these presses will answer for other makes. The Ferracute Machine Company's coining-press

has two side-columns and an arched top. The blanks to be stamped are fed in between the dies, which are located near the top of the machine, the toggle-joint which gives the pressure being located below, in order that no oil or grease may come from them to the coins. The arrangement also prevents any lost motion resulting from wear. The stroke which gives the pressure is only one eighth of an inch, which is much less than most presses of the sort, there being usually a long stroke to give better access to the dies. In this machine the upper die is fastened in an oscillating head, which can be swung out of place when it is desired to examine or clean the dies. A feeding-attachment is also provided.

Pattern-stamping presses are made in great variety for cutting and forming such work as oil-stove tops, ceiling-plates, stove-boards, furnace parts, shovels, etc. Lighter forms serve for cutting out pieced tinware, stovepipe elbows, coal and mortar-hods, armature disks, metal shingles and metal lath.

Deep-edged hollow work, such as metal cups for machines, dish-like articles of copper, silver, aluminum, etc., are formed in what is generally styled the drawing-press. In these the blank of sheet metal is held between two flat surfaces under a heavy pressure, amounting sometimes to several tons, while the central descending punch draws it from between them in a conical or cylindrical shape, leaving the sides without wrinkles—the metal being upset or thickened circumferentially and stretched or drawn out radially as the outer parts are reduced in diameter. In some work it is impossible to prevent wrinkling of the body in drawing. It is then necessary to remove the wrinkles later in a spindle lathe. Deepening or redrawing presses are also used for articles which cannot be sufficiently drawn out by a single operation.

A light form of press, in which the pressure is obtained by a screw, is manufactured for embossing, lettering or small fancy work on articles already formed in heavier machines.

Presses for special work are almost too numerous to place in a category. A few of the more important are the sugar-press, used for expelling molasses; the cane, hop, jelly, wine and oil presses, whose name tells their use; the bundling-press, for compressing skeins of yarn and similar articles into packages of rectangular form; the baling-press, serving a similar purpose for hay, cotton and other articles done up in bales; button-press, for stamping together the parts of a button, or for stamping out the blanks and impressing a design; crimping-press, for pressing leather articles into form; hat-press, for bringing a hat of felt or other material into form; concrete-press, for compressing soft concrete into building-blocks; upsetting-press, for upsetting a portion of a wheel-tire and shortening it by cramping the metal together; wiring-press, for wiring together pieced tinware, etc.

While the majority of presses described derive their power from the toggle-joint or some similar form of lever, yet many of the lighter forms make use of a screw to secure pressure. Some of the screwpresses have a heavy bar with weights at the

end, which may be whirled around, giving a fly-wheel action, from which the name *fly-press* is derived. The name *cam-press* is given where a cam or cams are used to give the pressure; *pawl-press* where a pawl and ratchet drive the screw; *wedge-press* where the inclined plane or wedge principle is used; and compound-lever, duplex-lever and similar names are applied to indicate other mechanical principles involved.

C. H. COCHRANE.

PRESTON, a village and the capital of Fillmore County, southwestern Minnesota, 100 miles S.S.W. of St. Paul, on the Chicago, Milwaukee and St. Paul railroad. It is in a farming and dairying district, and contains a graded school, a grist-mill, a woolen-mill, a brewery and two wagon-factories. Population 1890, 1,580; 1895, 1,316.

PRESTON, HARRIET WATERS, an American writer; born in Danvers, Massachusetts, about 1843. She first attracted public attention by her translations of Sainte-Beuve, Musset, Mistral, and other French writers. Among her original writings are *Love in the Nineteenth Century* (1874); *Troubadours and Trouvères* (1876); and *A Year in Eden* (1886).

PRESTON, MARGARET JUNKIN, Southern poetess, of a religious cast, was born at Philadelphia, Mar. 29, 1820, and died at Baltimore, Md., Mar. 28, 1897. In 1856 Mrs. Preston published *Silverwood*, a book of memories of child life. Ten years later appeared *Beechenbrook*, a collection of war poems written by the light of "Confederate candles." Subsequently she published *Old Songs and New; Colonial Ballads, Sonnets, and Other Verses; For Love's Sake*, etc. Much of her work is delicate in finish and pure in sentiment, the product chiefly of deep religious feeling.

PRESTON, THOMAS SCOTT, an American Roman Catholic clergyman; born in Hartford, Connecticut, July 23, 1824. He was educated for the Protestant Episcopal ministry; was graduated at Trinity College, Hartford, in 1843; was ordained a minister in 1846, and was in pastoral service in various cities in New York, and was assistant rector of St. Luke's Church, New York City. He was converted to Catholicism, and became a Roman Catholic priest in 1850. He was appointed chancellor of the diocese of New York in 1853, and afterward made rector of St. Ann's, New York. He published several works including: *Christian Unity* (1866); *Reason and Revelation* (1868); and *Christ and the Church*. He died in New York City, Nov. 4, 1891.



THOMAS S. PRESTON.

PRESTWICH, SIR JOSEPH, a British geologist; born in Clapham, near London, March 12, 1812. He was educated at Reading and at University College, London, where the bent of his mind was directed toward science by the lectures of Dionysius Lardner on natural philosophy. Though following a commercial rather than a scientific career, until

far advanced in life, Mr. Prestwich contrived to give great attention to geology and to contributions, partly undertaken at the suggestion of Sir Roderick Murchison, to the *Transactions* of the Geological Society. These contributions were mainly the results of his own observation and study of geological formations in the British Islands, including investigations into the sequence of organic remains in the London clay, into the valley gravels supposed to contain remains of man and his works in association with extinct mammalia, and into the interesting evidences relating to the ichthyolites of Gamrie, in Banffshire, Scotland. The contemporaneity of man with the mammoth and other Pleistocene mammalia was fully established, and the antiquity of man came to be the most absorbing topic of the time. That vexed question still remains under discussion, although Prestwich, in some of his later articles, sought rather to reduce than to extend the time-limits of man's existence. In 1851 Prestwich published *A Geological Inquiry Respecting the Water-bearing Strata of the Country Around London*, which soon became the standard authority on the subject, and led to its author's appointment on the Royal Commissions on Metropolitan (London) Water-Supply in 1867, and to that of the Royal Coal Commission, to the reports of which, published in 1871, he contributed valuable papers on the Bristol and Somerset coal-fields. In these investigations he was led to infer that concealed coal-fields might extend from Somersetshire east to Folkestone, an inference which has been verified as correct by subsequent explorations at Dover. In 1853 Prestwich was elected a Fellow of the Royal Society, and in 1870 was appointed a vice-president. In the latter year he was chosen president of the Geological Society, and delivered two addresses before it on water-supply and on deep-sea researches. In 1871 his three great papers on the structures of the crag-beds of Suffolk and Norfolk were published by the Geological Society, while his attention was directed to the subject of the later tertiary deposits and the enumeration of organic remains. In 1874 the chair of geology at Oxford was accepted by him, and as the partial result of his labors in his professoriate there appeared from his pen two large volumes entitled *Geology, Chemical, Physical and Stratigraphical*. In 1896 he was knighted. He died at Shoreham, Sussex, June 23, 1896.

PRESUMPTION. See EVIDENCE, Vol. VIII, pp. 742, 743.

PRETENDER. See CHARLES EDWARD, Vol. V, p. 426; also JAMES FREDERICK, Vol. XIII, p. 560.

PRETORIA, the capital of the South African Republic or Transvaal, is 1,040 miles N.E. of Cape-town. It derives its name from Pretorius, one of the Boer leaders, and is a thriving place, well built, and with a considerable trade. Since the establishment of the South African Republic the progress of Pretoria has been so rapid that its population can only be approximately stated. Its white population is estimated at 8,000. Pretoria is the see of a bishop, who was consecrated in 1878. It contains 20 English schools, besides a model school (255 pupils) and a gymnasium. Pretoria is con-

nected with Capetown by railway via Bloemfontein, Kroonstadt and Germiston, and a line from Natal runs to Charlestown, about 160 miles from Germiston. In 1895 Pretoria was also connected by rail with Lorenzo Marquez, the Portuguese port on Delagoa Bay. The surrounding district is very fertile, being capable of producing wheat, tobacco,



GOVERNMENT BUILDING AT PRETORIA.

indigo, coffee, cotton and sugar-cane. Coal and other minerals are also found within it. The trials of the Uitlander reformers took place in the Pretoria government building in 1896, and after their conclusion the Boers planned a series of fortifications to protect their capital from internal disturbance or external attack. Pretoria contains the official residence of the President of the South African Republic.

PREVENTION OF CRUELTY TO ANIMALS. See CRUELTY TO ANIMALS, PREVENTION OF, in these Supplements; and, CRUELTY TO CHILDREN, PREVENTION OF, in these Supplements.

PREVIOUS QUESTION. See PARLIAMENTARY LAW, in these Supplements.

PREYER, THIERRY WILLIAM, a German physiologist; born in Manchester, England, July 4, 1841. He studied in Bonn, Paris, Vienna, Berlin and Heidelberg. He was appointed professor of physiology at Yena in 1867. He published *Prussic Acid* (1870); *Blood Crystals* (1871); *The Struggle for Life* (1868); *Physiology of the Embryo* (1885); *Hypnotism* (1890); etc.

PRIACANTHIDÆ, a family of small fishes, mostly tropical, commonly known as big-eyes. One species, *Priacanthus altus*, occurs on the New England coast.

PRIIBILOFF ISLANDS, a group of four islands in the Bering Sea, belonging to Alaska, about 250 miles N.W. of Unalaska. These islands are volcanic; the two largest are St. Paul and St. George. These islands are the breeding-place in summer of fur-seals. The islands are a government reserve, and are leased to companies for terms of twenty years.

PRICE, in economics. See VALUE, Vol. XXIV, p. 46.

PRICE, BONAMY, a British economist; born in the island of Guernsey, May 22, 1807. He was educated at Oxford; was teacher of mathematics at Rugby (1829-50); became professor of political economy in Oxford (1868); lectured on free trade in America (1874); and wrote much on financial and economical subjects. Among his publications

are *Principles of Currency* (1869); *Of Currency and Banking* (1876); and *Chapters on Practical Political Economy* (1878). He died in London, Jan. 8, 1888.

PRICE, STERLING, an American soldier; born in Prince Edward County, Virginia, Sept. 11, 1809. He was educated at Hampden-Sidney College, and after a law course removed to Chariton County, Missouri, entering actively into politics and public affairs. He was sent both to Congress and to the state legislature, and when the Mexican War broke out he resigned his seat in the former body to serve as colonel of a cavalry regiment. He was placed in command of the territory comprised in New Mexico, invaded old Mexico, gained several brilliant victories, and was made military governor of Chihuahua. He was governor of Missouri from 1853 to 1857, and served in various other offices within the state. He was elected president of the state convention of 1861; on the outbreak of the Civil War became major-general of the Missouri state Confederate forces, and fought and defeated General Lyon at Wilson's Creek. He was superseded by Van Dorn, participating in the campaigns of that general till the latter was ordered to Tennessee; he also took part in the Mississippi campaign under Beauregard and Pemberton, and was next transferred to the command of the Army of the West. He saw service in Tennessee, and was again placed under the command of Van Dorn. He was then transferred to the trans-Mississippi department and was assigned the command of Arkansas, whence he was driven by General Steele. From that time he was engaged in guerrilla warfare in Missouri. At the close of the war he went to Mexico, but returned in 1866. He died in St. Louis, Missouri, Sept. 29, 1867.

PRICE, THOMAS RANDOLPH, an American educator; born in Richmond, Virginia, March 18, 1839. He was graduated at the University of Virginia in 1859, and afterward spent two years in study in Berlin and Kiel, Germany. During the Civil War he was in the Confederate army; was appointed professor of Greek and Latin in Randolph College in 1867; professor of Greek in the University of Virginia in 1876; and in 1882, professor of English language and literature in Columbia College, New York. He published several works, among them *The Teaching of the Mother Tongue* (1877) and *Shakespeare's Verse Construction* (1889).

PRICKLY-ASH, a tree of the family *Xanthoxylaceæ*, or, as some later botanists place it, of this tribe of the rue family (*Rutaceæ*). The *Xanthoxylum Americanum* is the abundant prickly-ash of the northern United States. It is a shrub, with an aromatic, pungent bark. The Indians were known to chew the bark for the relief of toothache, hence the name sometimes given to this shrub of "toothache tree." The southern prickly-ash is the *X. Clava-Herculis*. It is a large shrub or tree, with numerous sharp prickles.

PRICKLY-PEAR. See CACTUS, Vol. IV, p. 625.

PRIDE'S PURGE. See PRIDE, Vol. XIX, p. 723.

PRIESTLEY, WILLIAM OVEREND, a British surgeon; born near Leeds, Yorkshire, June 24, 1829.

He was educated at the University of Edinburgh, and took the degree of M.D. in 1853. Settling in London as a physician in 1856, he became one of the lecturers at the Grosvenor Place School of Medicine. Somewhat later, he was appointed lecturer on midwifery at the Middlesex Hospital, and in 1862 professor of obstetric medicine in King's College, London, and physician to King's College Hospital. He was knighted in 1893. He was examiner at the University of Cambridge and the Victoria University. Dr. Priestley published various works on natural history and medicine. Among his publications are *The Development of the Gravid Uterus* and *Obstetric Works*.

PRIMARY CELLS. See ELECTRICITY, §§ 97 and 108, in these Supplements.

PRIMARY ELECTIONS. The basis of all political organizations in the United States, the point where is begun and upon the action of which depends the nomination of party tickets, from those which include the candidacy of the town mayor or alderman to those which have at their head the candidate for the Presidency of the United States, is the primary or district caucus. The primary and the caucus (q.v., in these Supplements) are to some extent the same, but usage and legislation have added to the primary in most of the states the necessity of a secret ballot by those qualified to vote under the rules of each party. The term caucus carries with it an idea of *viva voce* voting, while primary implies a formal vote in determining the choice of delegates. With the formation of political parties and the consequent party machinery, it was found necessary to adopt some plan by which an expression of the wishes of partisan voters might be obtained without requiring a large gathering. The primary meeting was designated by custom as the originating-point for all political action: there the partisans of a ward, precinct or township gathered and gave expression to their wishes both as to candidates for office and the platform. These wishes were in turn conveyed to a higher convention by delegates, and so on until the national convention was reached. The primary was in this way the part of the political machinery the control of which fixed the character of the larger convention. While population was scattered, and an acquaintance of the voters one with another was possible, the primary, after the manner of the town-meeting, served its purpose well. In rural districts the primary is still amenable to good purposes. But in cities, where extended acquaintance is impossible, unprincipled and designing leaders sometimes "pack" the meeting and instruct and elect delegates to serve their own ends. Frauds are thus perpetrated, and the control of the party vote in large cities is placed in the hands of a few "bosses." The better class of citizens revolted against this rule, and the system of primaries has been in many states so altered that due notice of the time and place of the meeting is required to be given. Further changes direct nominations to be made by ballot; voting-places are kept open a definite number of hours on a fixed day; judges, clerks and challengers are appointed, and a register of the voters kept. The qualifications of a voter,

however, remain to a great extent in the hands of the party leaders. Generally, only those are allowed to vote whose names are on the registration-rolls of the last city, county or state election. In some of the larger cities a party list is kept by district committee-men of all known voters of their particular party within the limits of the district, and no one can vote at the primaries whose name is not on this list. While this places the control of the district in the hands of a few, yet when occasion requires a fair expression of party opinion can be obtained. Many states have legislated to govern primary elections. These laws are many and varied. The general plan as here outlined is the usual result of such legislation. While the system of primary elections has been modified and reformed, yet owing to the indifference and neglect of the better class of party voters the nominations are largely controlled by men who make politics a business. It should be realized that only so far as the primaries are carried for good-citizenship will the national convention be controlled by principle.

PRIMATES. See MAMMALIA, Vol. XV, pp. 444-446; and ANTHROPOLOGY, Vol. II, pp. 108-110.

PRIME, SAMUEL IRENÆUS, an American clergyman and editor; born in Ballston, New York, Nov.



REV. DR. S. I. PRIME.

4, 1812. He was a graduate of Williams in the class of 1829. He entered the Presbyterian ministry in 1833, but was obliged to give up pastoral work on account of his health, in 1840. From that time until his death he was editorially connected with the New York *Observer*, and traveled in Europe, contributing to the *Observer* his famous *Irenæus's Letters*. He was also a regular contributor to *Harper's*

Magazine, and was officially connected with Wells College and Williams and a large number of benevolent societies. He published numerous books descriptive of his travels and on religious subjects. Among his works are *The Old White Meeting-House* (1845); *Travels in Europe and the East* (1855); *Power of Prayer* (1858); and *Irenæus's Letters* (1880-85). He died in Manchester, Vermont, July 18, 1885.—His brother, NATHANIEL SCUDDER, a Presbyterian clergyman; born in Huntington, Long Island, April 21, 1785. After his graduation at Princeton he was ordained a minister in 1805. He was afterward pastor of churches in Long Island, and at Cambridge and Newburg, New York. He was the author of *A Collection of Hymns* (1809); *A History of Long Island* (1845); and other works. He died in Mamaroneck, New York, March 27, 1856.—His brother, EDWARD DORR GRIFFIN, also a Presbyterian clergyman; born in Cambridge, New York, Nov. 2, 1814. He was graduated at Union College in 1832, and from 1838 to 1853 was pastor of churches in Scotchtown, New York, and New York City. He became editor of the New York

Observer during his brother Irenæus's absence in Europe. He contributed to the paper under the name "Eusebius," and continued with the *Observer* until 1886, when he was compelled by his health to give up work. He wrote *Around the World* (1872); and *Forty Years in the Turkish Empire* (1876).—Another brother, WILLIAM COWPER, a journalist; born in Cambridge, New York, Oct. 31, 1825. After his graduation at Princeton in 1843, he studied law and was admitted to the bar of New York in 1846. In 1861 he became editor of the *Journal of Commerce*, and was actively engaged in editorial work until 1869. From that time on he devoted his time to the study of art, and in 1884 was appointed professor of art history in Princeton. He traveled extensively and published a number of works, among which are *The Owl-Creek Letters* (1848); *Boat Life in Egypt and Nubia* (1857); *I Go a-Fishing* (1873); and edited *McClellan's Own Story* (1886.)

PRIME MOVER. See MECHANICS, Vol. XV, pp. 772, 773.

PRIME NUMBERS. See TABLES, Vol. XXIII, p. 7.

PRIMING-MACHINE, a machine for priming cartridge-shells or percussion caps. The percussion composition, in the form of a thick paste, is placed in the magazine of the machine, which is dish-shaped. The shells or caps are fed upon punches upon a horizontal rotating disk. Four tubular feeders are mounted on a rotating spindle above, moving in the direction opposite to the shells or caps. These feeders dip into the magazine in their circuit, imbibe a supply of the paste and drop it into the shell or cap as they meet in rotating.

PRIMITIVE BAPTISTS. See BAPTISTS IN THE UNITED STATES, in these Supplements.

PRIMITIVE METHODISTS. See METHODISM, Vol. XVI, p. 192; and METHODIST CHURCHES, in these Supplements.

PRIMITIVE WESLEYANS. See *Wesleyan Methodism*, under METHODISM, Vol. XVI, p. 191.

PRIMROSE LEAGUE, a league which originated in England in 1883, in memory of the Earl of Beaconsfield, and so called because on the anniversary of his death every member wears a bunch of primroses. The flower is also the badge of the league. The members, who include both sexes, are styled Knights, Dames and Associates, and their branches are called Habitations. The members of the Primrose League have taken active part in electoral campaigns and have exercised considerable influence in London and its neighborhood in favor of the Constitutional-Unionist candidates. In 1895 there were 1,279,685 members in Great Britain, divided among 2,308 Habitations.

PRIMULACEÆ. See PRIMROSE, Vol. XIX, p. 737.

PRINCE, THOMAS, an American clergyman; born in Sandwich, Massachusetts, May 15, 1687. He was graduated at Harvard in 1707 and spent the next ten years abroad. Upon his return he became assistant pastor of the Old South Church, Boston. He made a complete collection of colonial historical documents, some of which were destroyed during the Revolution and the remainder are deposited in

the Boston Public Library. He published numerous sermons and several miscellaneous works, among which are *Account of the English Ministers at Martha's Vineyard* (1727); *Earthquakes of New England* (1755); and two volumes of *The Chronological History of England* (1736-55). He died in Boston, Massachusetts, Oct. 22, 1758.

PRINCE EDWARD ISLAND, a province of the Canadian Dominion, and for its area the most densely populated of the confederated provinces. (For geographical location and geological description, see PRINCE EDWARD ISLAND, Vol. XIX, pp. 739-741.) It has 210 miles of railway in operation, extending from end to end of the province, and it has steamship communication with the mainland, which is kept open throughout the winter. Owing to its insular position, it enjoys a more equable climate than the adjacent provinces. The population in 1891 was 109,078, of which only 13 per cent is urban and 87 rural. Charlottetown is the capital and seat of local government; its other chief towns are Summerside and Georgetown, the population in all of which appears, in the last ten years, to be stationary.

The chief industry on the island is the fisheries, the capital engaged in which approximates half a million dollars in value. Lobsters and oysters form a considerable portion of the exports, together with mackerel, cod, herrings and smelts. The value of the total catch in 1894 was \$1,119,738; of this amount a little less than half, or \$447,813 worth, was exported. Prince Edward Island, says a recent writer, has a soil of great natural fertility, while for agricultural purposes the island possesses a unique advantage in immense deposits of "mussel mud"—the decayed organic remains of various kinds of shell-fish—which, in the course of centuries, has accumulated to a great depth in the bays and river mouths of the coast. Raised by dredging through the ice during the winter months, and applied to the soil, this proves a most valuable fertilizer, and adds greatly to the productive capacity of the island. Agriculture, however, forms little of an export, though cheese factories have recently been established, of which there are now 16, the output of which, in 1893, amounted to \$78,380. The statistics of 1891 show that there is considerable live-stock in the province. The returns for the year were: Horses, 37,402; horned cattle, 91,629; sheep, 147,097; and swine, 42,652. The religious census of the island for 1891 gives the following figures: Roman Catholics, 47,837; Presbyterians, 32,988; Methodists, 13,301; Church of England, 6,646; and Baptists, 5,749. The revenue of the province for the year 1894 amounted to \$280,000, with a like expenditure. The principal item in the revenue is the Dominion subsidy of \$221,052 per annum. The Dominion Statistical Year-Book for 1894 fails to record the debt of the province; the provincial treasurer, however, owns to a debenture and loan indebtedness, Dec. 31, 1894, of \$225,265. Prince Edward Island has only one legislative chamber—the assembly, with 30 members. The provincial executive is composed of eight members, five of whom are without portfolios. At the nominal head

of the government is a lieutenant-governor. The province is represented in the Federal Parliament by five (formerly six) members, with four members in the Senate.

PRINCE OF THE PEACE. See ALCUDIA, Vol. I, p. 471.

PRINCE OF WALES, CAPE. See ALASKA, Vol. I, p. 444.

PRINCE RUPERT'S DROPS. See GLASS, Vol. X, p. 656.

PRINCETON, a city and the capital of Bureau County, northern central Illinois, 32 miles W. of Ottawa and 74 miles W. of Joliet, on the Chicago, Burlington and Quincy railroad. It has flour-mills, extensive carriage and cart works, grain-warehouses, foundry and machine-shop, two libraries, a high school founded in 1867, and three national banks with a combined capital of \$315,000. Population 1890, 3,396.

PRINCETON, a village and the capital of Gibson County, southwestern Indiana, 23 miles S. of Vincennes and 27 miles N. of Evansville, on the Baltimore and Ohio and the Louisville, Evansville and St. Louis railroads. It has extensive railroad repair-shops and tile-works, flour and lumber mills and carriage-works; is surrounded by a fine wheat and grain growing country, and is an important cattle market. Population 1890, 3,076.

PRINCETON, the capital of Caldwell County, western Kentucky, about 45 miles E. of Paducah, on the Chesapeake, Ohio and Southwestern and the Ohio Valley railroads. It is the seat of Princeton College, and has two flouring-mills, a woolen-mill, a carriage factory and two tobacco stemmeries. Population 1890, 1,857.

PRINCETON, a village and the capital of Millelacs County, northwestern Minnesota, 48 miles N.W. of St. Paul and 28 miles E. of St. Cloud, on the Great Northern railroad. It has a newspaper office and a flour-mill. Population 1890, 816; 1895, 1,087.

PRINCETON, a town and the capital of Mercer County, northwestern Missouri, on the southwestern branch of the Chicago, Rock Island and Pacific railroad, 25 miles N. of Trenton and 48 miles N. of Chillicothe. It has a brewery, the Princeton Normal Institute and a cigar factory. Population 1890, 1,410.

PRINCETON, a borough of New Jersey. It is situated on the old highway between Philadelphia and New York, which is here a beautiful wide avenue, on the south side of which extends the campus of Princeton University, and on the north side the business portion of the town. The avenue is beautifully shaded by fine elms and lighted with arc lights, and along its western portion are many residences built in the old colonial style. The battlefield is located near here, on which General Mercer fell, and the house where he died is still standing and open to visitors. Princeton is supplied with city water from drive-wells, has banks, and publishes several papers. The *Princetonian* (daily), the *Tiger* (weekly) and the *Nassau Literary Magazine* (monthly), all published by the students, are of high merit. Near the town is situated Evelyn College, an insti-

tution for women, independent in government, but having many of the instructors and courses of the College of New Jersey. Population 1890, 3,442; 1895, 3,488. See PRINCETON, Vol. XIX, p. 742.

PRINCETON, a village of Green Lake County, southeastern central Wisconsin, on the Fox River, and on the Chicago and North-Western railroad, 35 miles W. of Fond du Lac. Beans, potatoes, grain and live-stock are the chief products of the country. It contains flour, feed, planing and sorghum mills, foundries and carriage-shops. Population 1890, 986; 1895, 1,195.

PRINCETON UNIVERSITY OR THE COLLEGE OF NEW JERSEY, at Princeton, New Jersey, ranks fourth in order of founding among American colleges. It received its charter in 1746



NASSAU HALL, PRINCETON UNIVERSITY.

from John Hamilton, president of His Majesty's Council, and was the first college ever given a charter by a governor or acting governor with the simple consent of his council. The college originated in the plan "to found an institution in which ample provision should be made for the intellectual and religious culture of youth desirous to obtain a liberal education, and more especially for the thorough training of such as were candidates for the ministry." The college was opened in May, 1747, at Elizabeth, under the presidency of the Rev. John Dickinson, who died in October, and was succeeded by Rev. Aaron Burr. A second and more ample charter was granted the college in 1848, equal advantages and privileges being given to members of every denomination of Christians. On the death of its first president, the seat of the college was removed from Elizabeth to Newark, the residence of the second president, where it remained until 1757, when it was removed to Princeton on securing the erection there of Nassau Hall (named in memory of William III). This is the oldest college building, and was erected in 1756. Those who received the original charter, and who built up the college, were connected with the New York Presbyterian Synod, but no organic connection with Presbyterianism was adopted. From 1766 Presbyterians generally united in support of the college, and in 1812 the General Seminary established its Theological Seminary at Princeton, but the latter is still unconnected with the college. Nassau Hall has been famous in the

historical annals of the United States. During the Revolution it was occupied by the American and the British troops as a barracks, and also as a hospital. At the battle of Princeton, Jan. 3, 1777, General Washington attacked the British, who were occupying the hall, and during the engagement a shot penetrated the walls of the hall, piercing a portrait of George III. Its place was afterward filled by a portrait of Washington, obtained with money which the General donated to the college for damages made during the war. In 1783 the Continental Congress met in the hall. In the same year the college commencement was attended by Washington and the members of Congress, this being the occasion of the presentation by Washington of the above-named donation. The benefactors of the college have been numerous and liberal. By means of donations from them, the institution has gradually extended, libraries, museums, laboratories, observatories, a commencement hall of great beauty, as well as athletic fields, having been added. The college grounds now cover 225 acres, adorned with lawns, fine old elms and handsome buildings. The dormitories are extensive and their accommodations excellent. A portion of the west wing of old Nassau Hall is used for dormitories, the other portions being occupied by laboratories and offices of the museum and instructors. It was during the brilliant presidency of Dr. McCosh that the college reached its present dimensions and importance,—a period which has brought its development up to a university status, its scope comprising departments of philosophy, language and literature, mathematics and science.

The college includes a large scientific department, known as the John C. Green School of Science. This was founded in 1873, upon a liberal endowment of John C. Green. It offers instruction in the three departments of general science, civil-engineering and electrical engineering.

The college grants degrees as follows: A.B., A.M., M.S., Ph.D., D.Sc. and B.D.; the John C. Green School of Science granting C.E., B.S., and E.E. (electrical engineer); and the honorary degrees of LL.D. and D.D. There are numerous scholarships and fellowships, and special arrangements are made for the admission of students having marked abilities, but whose means are limited. Besides the psychological and scientific laboratories, the astronomical observatories are well equipped. The university athletic field is one of the best and most perfectly kept in the country. Princeton ranks among the leaders in intercollegiate contests. The examinations are conducted on the "honor system," which puts the student entirely on his honor to be fair in his examinations. He is only required to sign a declaration that he will not seek or receive aid during his period of examination, and he is then allowed whatever other freedom he likes. The system has been found to work well, the students having a board which would promptly deal with any discovered breach of trust, but the services of the board have not been necessary since two cases, which occurred during the first year of the trial of the system. Francis Landey Patton, D.D., LL.D., was inaugurated president, succeeding Dr. James McCosh, June

20, 1888. The number of students in 1895-96 was 1,088, and included students from the Hawaiian Islands, India, England, Scotland, Syria, Asia Minor, Brazil, China, Macedonia and Germany.

Among the chief features of the college are the Cliosophic and the American Whig societies. Both possess fine marble buildings, patterned after a Grecian temple, forming the south side of the quadrangle. They have extensive libraries, and embody many of the attractions of student-life, every means being taken to foster the spirit of fraternity in its strongest form. These societies pursue courses of literary exercises, award coveted prizes for orations, essays and debates, and grant diplomas to their respective graduates. Senior and junior debates occur regularly, and are leading and exciting events of the year. On Oct. 21, 1896, Princeton celebrated its sesquicentennial, or one hundred and fiftieth anniversary of its foundation, when the college assumed the title of University. For the PRINCETON THEOLOGICAL SEMINARY, see THEOLOGICAL EDUCATION in these Supplements; see also PRINCETON, Vol. XIX, p. 742.

PRINTING. See TYPOGRAPHY, Vol. XXIII, pp. 681-710; and PRINTING-PRESSES and TYPE-SETTING MACHINES, in these Supplements.

PRINTING, PHOTOGRAPHIC. See PHOTOGRAPHY, in these Supplements.

PRINTING-PRESSES. (For the history of the invention and progress of the art of printing, in all its many departments, and a full exposition of that art, together with accurate definitions and descriptions of the phraseology of the composing-room and pressroom, the reader is referred to TYPOGRAPHY, Vol. XXIII, p. 681; and to the *Index*, under the various titles.) The evolution in the mechanics of printing has, during the past generation, been greater than ever before known in the whole history of the art. Especially is this to be noticed in the matter of presses. In order to better appreciate these remarkable developments, it will be well to trace the various stages of growth.

In the primitive Chinese method of printing, copies were obtained from the engraved blocks by merely rubbing or tapping with a stiff brush the backs of the sheet of paper to be printed. The process was necessarily very slow.

In the *Old Wine Press* of Gutenberg, the sheets were laid on by hand, and the ponderous screw turned slowly down, also by hand, to form the impression. Not more than fifty impressions could be made in an hour. The *Blaew* press of 1620 was a radical improvement, and of so marked a character that for more than a century and a half it stood alone, no attempt at advancement being made. The screw as a lever was not abandoned, but simplified, as well as the carriage. A "coffin" was built, serving as a receptacle for a stone, usually of marble, which was the bed of the old presses. The capacity of the *Blaew* press was about 150 impressions an hour, with two men.

The *Stanhope* press, built in the latter part of the eighteenth century, was wholly of iron, and was immediately received by the printing world as a remarkable advance in the art of printing-press

construction. It may be considered as the first real improvement upon the press as originally invented, having been preceded by an incomplete attempt in America, afterward perfected into the *Columbian* press, and also in France by a plan proposed by Annison. Its capacity was about 180 impressions an hour, with two men.

The *Franklin* press, also brought out in the latter part of the eighteenth century, was a modified form of the *Blaew*, and was capable of giving 250 impressions per hour. The press that was worked by Benjamin Franklin is in the Patent-Office at Washington.

THE ADAMS PRESS. In 1824 Daniel Treadwell conceived the idea of a power-press, but was unfortunately burned out and abandoned the matter. Isaac Adams took up the work and produced a press which, while it was neither a hand-press nor a cylinder, held an important place in the printing world. The Adams had a stationary platen and a bed that did not move backward and forward. Its only movement was up, to press against the platen, and down to its former place again. This rise and fall was a considerable one, as the rollers had to pass between the form and the impression surface. The sheet was fed in from above the ends of the machine, and was taken to the point of impression upon a frisket, with a power estimated at from forty to sixty tons. Fifty-four sizes and styles were made, including two, four and six roller presses. The Adams presses were favorites for more than fifty years, and some are in use even at the present date.

The *Washington* press, invented in 1829 by Rust, was the last of the leading representative hand-presses, and the best. It is in general use to-day in the United States, and undoubtedly marks the limit of inventive genius in the line of hand-presses. It avoided the complexities of the *Columbian*, and, while it combined every good feature required in a hand-press, avoided all the objectionable ones. The toggle-joint, which is peculiar to this press, gives, with the minimum of exertion, a very heavy impression when desired; the parts are generally simple and easily understood. The bed slides on a track, and is, by the left hand, run in under the platen by two turns of a crank with a belt attached to its pulley. The right hand seizes the lever-handle and the platen is depressed by a compound lever acting on the toggle-joint. The platen is restored to its normal position by lifting-springs on either side. Its tympan is a frame covered with cloth and attached to the bed. It is on this that the sheet of paper is laid. A delicate frame above it, called the frisket, is folded down, holding the sheet of paper by the margin. The crank is turned, the bed run under, the impression given, the crank reversed, the tympan and frisket lifted, and while the sheet is being removed an attendant inks the form preparatory to the working of the next sheet.

The only improvement thus far suggested is an elaboration of an idea suggested and acted upon by Dr. William Church of Connecticut, in 1821. In the press invented and manufactured by him he dispensed with the roller-boy and other hand features, accomplishing the work by mechanical ap-

pliances. He laid the sheet on the tympan and applied his hand to the rounce, by the turning of which the form was inked. Then the frisket and tympan turned down, the bed ran in, and the impression was given. A reverse of the motion reversed the process, and while the sheet was in action it prepared for the next sheet.

There is at present manufactured an excellent hand-press which has an automatic inking and delivery attachment, and is known as the "Schorn," from the inventor, T. G. Schorn of Iowa. The form is rolled during the movement of the bed forward and backward. The ink is supplied from a fountain and conducted by a feed-roller to the distributing-table, from which the form-rollers receive their supply in turn. The distribution is accomplished by angle rollers. The feed is similar to that on cylinder presses, and may be done by the pressman, or by a feeder standing on the opposite side of the press. When the latter is done, the pressman has only to run the bed in, pull the impression and run the bed out, everything else being done automatically, even to the delivery of the printed sheets. The register is equal to that of ordinary cylinder work, and the inking is far better than is generally done by hand. The attachments are manufactured for seven, eight and nine-column presses. The capacity of the press is doubled.

JOB-PRESSES. The first step in the way of labor-saving appliances in connection with the art of printing was the treadle—a utilization of foot-power, whereby the hands were left free for other use than giving power. The treadle-machine is necessarily very different from the hand-press as previously used, inasmuch as the power is to be applied from below by the feet, instead of from above by the hand and arm.

The pioneer press of this description was invented by an American, Daniel Treadwell, who went to England in 1820 and took out a patent. It was the first of a very important series of inventions pertaining to printing, each one an improvement upon its predecessor. There was great originality in the construction of the Treadwell; its operations were conducted with much facility by one man, and as the rolling of the table and the horizontal movement of the bar were dispensed with, the labor was greatly reduced.

A general description of the principles involved in the construction and working of a treadle or job press, especially one of the present day, will show a framework with the pedal necessarily at the bottom. It is the simplest of machine-presses worked by other than hand-power. It consists of a bed for the reception of the form of type properly secured in its chase. The bed, unlike that in the hand-press, which has bed and platen both horizontal, is fixed at a convenient angle, usually perpendicular, or nearly so, while the platen, on which is placed the blank sheet or card, is at an angle convenient for examination and any needed adjustment.

The two, the bed and the platen, are like open jaws at an open angle of about fifty degrees. The form of the type secured in the chase is clamped to the bed, when the platen, by the action of the

treadle, rocks on a pivot and comes into parallelism with the bed. As it approaches the type, the gearing operates a lever varying in different machines, and at the instant of absolute parallelism gives an impact of regulated strength.

The inking of the form is automatic, and is done by feeding the ink from a reservoir in the back part of the press, by a series of rollers playing on a revolving disk. The operator, while one foot is working the treadle, has both his hands for use in feeding the blank sheets or cards and taking away the printed work. The speed varies in different machines from 800 to 1,500 impressions an hour, according to the skill of the operator.

The Universal Press, invented in 1869 by Merritt Gally of New York, combines all the best features of every previously named press, with marked improvements. Simplicity of mechanism and ease of action have been studied and attained. As the Washington has for two generations been regarded as the highest type of hand-press, so the Universal, or Gally, would seem to be the highest type of treadle-press yet attained. It is adapted to the finest and most delicate kinds of printing, and can, by the change of a few screw-regulators, be converted into an embossing-press of most marvelous power.

Nearly all the manufacturers of treadle-presses have of late years added a wheel for belt-power, thereby increasing their capacity and affording a steadier working to the machine.

CYLINDER PRESS. The first advance on the Koenig cylinder was made by Applegarth and Cowper, in 1827, 16 years after Koenig's success, when they produced an improved press for the London *Times*. It had four cylinders, and gave 4,000 to 5,000 impressions in an hour on one side of the sheet. It was regarded as a remarkable advance in the matter of presswork.

Donkin and Bacon's machine (1813) was built for the University of Cambridge. Several forms were attached on the sides of a prism, and were presented consecutively to the inking-cylinder and paper-cylinder. This machine was cumbersome and soon passed out of date. It was the first printing-machine in the world to discard the ancient hand-ball and to adopt composition inking-rollers made of glue and molasses.

Power or cylinder presses are variously designated as "single," "double," "large," "small," "drum," "stop," "double-ender," etc. The "single" cylinder is a press with but one cylinder whether "large," "small" or "drum." The "double" cylinder has two cylinders, over which the sheets of paper are fed to *one* form. The form travels under both, and each cylinder has a feed-board with an attendant, one on either side of the press. At each round trip of the bed an impression is taken from the two cylinders. An inking-fountain is provided at each end. While very popular for a time, they have yielded to improvements, and are rapidly becoming things of the past. The "small" cylinder has the circumference of its cylinder so constructed that it will cover the form complete in a single revolution. It is especially adapted for quick work. The "large" cylinder gives but a portion

of its surface to the impression of the form, a large segment being removed, which, while the cylinder revolves, permits the form to return without the cylinder being lifted. The "drum" cylinder is a single large cylinder press, bearing the name "drum" because of similarity in form to a huge bass drum. It is not very rapid, but has peculiar advantages in fine work.

The "stop"-cylinder is so arranged that the cylinder stops automatically after the sheet is printed, and remains stationary while the bed is running back, during which time a fresh sheet is placed in position.

The "double-ender" is fitted with two fountains, one at either end of the press, which supply the ink in equal quantities, and at the head and tail of the form receive exactly the same amount.

The remarkable as well as rapid development in the mechanics of the cylinder press is best shown by a comparison of the first one built in 1814 and the highest type of those built at the present date.

The *Napier* press, called in America the "Lightning" (1847), was a mammoth affair. It was simply ten presses working on one great cylinder, and was probably the largest press, or combination of presses, ever manufactured. The noise it made was terrific. The name of "Lightning" was afterward abandoned, and that of "the old thrashing-machine" substituted.

All the foregoing presses and styles of presses printed the sheet on one side only. The paper was then turned over, new forms adjusted, or another press used, and the impression for the second side taken.

In 1860, William A. Bullock of Pittsburg, Pennsylvania, built the celebrated *Bullock* press and the *Cincinnati Times* had the honor of using the first machine turned out from his shops. It was a success. In carrying into practice his plans, Bullock fed the paper from a roll containing five or six miles of linear measurement, moistened it by passing it through a spray, carried it between the impression-cylinder and the form, first for one side, then for the other, and cut the sheets at proper intervals with great precision with a serrated knife which struck the paper with lightning-like rapidity. This knife was so constructed as rarely to need sharpening.

The forms of stereotype plates were mounted on cylinders, each having its own impression-cylinder and inking-apparatus. The roll of paper having been mounted in its place, the machinery was started and the paper unwound as fast as needed. In the earlier presses the sheets were automatically delivered on the receiving-board at the rate of 11,000 finished sheets an hour. By a most unhappy accident the celebrated inventor lost his life by being crushed in his own machinery, and a gloom fell on the printing world.

The Web Perfecting-Press. The history of the web perfecting-press begins in 1835, when Sir Rowland Hill, who became famous for his advocacy of penny postage in Great Britain, obtained letters patent for a web perfecting-press; that is, a press capable of printing from a roll of paper on both sides and cutting and folding the sheets.

The roll is one continuous sheet of paper, varying in length from three to nine miles, and of a width required by the size of the sheet to be printed. It is so compactly wound that it is easily handled, and, when placed in its bearings at the end of the press (or sometimes above it), uncoils very readily, being fed into the machine at any speed required.

In some presses the roll is cut into sheets before being fed to the forms; in others, the cutting is not done until after the final impression, and just previous to entering the folder.

The Serrated Blade. In 1853 Victor Beaumont of New York patented the serrated cutting-blade, set lengthwise in one of a pair of cutting-cylinders, having elastic surfaces inserted to hold the paper on each side of the cutting-blade when the sheet was cut from the web. To this device is largely due the success of all web printing-presses.

The Victory. This machine was invented in 1877 by Messrs. Duncan and Wilson of Liverpool, England. While it was generally built on the same principle as the Bullock, yet there were many important variations, and an added advantage in the facilities for folding the sheets as they left the press. It would print, cut, fold and deliver 8,000 complete papers per hour, of an eight-page paper fifty inches square; or print, cut, fold and paste at the back 7,000 24-page sheets per hour.

Ingram Illustrated-Work Printing-Machine. In 1877, William J. Ingram, son of the founder of the *Illustrated London News*, secured a patent for an invention on a web printing-machine, whereby the sheet was fed into the mechanism, receiving the first imprint from the letterpress form; thence it was carried diagonally downward to the picture-cylinder, which printed the illustrations on the other side. A species of guillotine cut off the sheets at the proper places, whence they were carried to the folding-machine. The finished papers were delivered at the rate of 6,500 an hour.

It has always been found, in practice, that cuts or engravings require much more careful inking than the letterpress, and that the ordinary inking-arrangements, which are found to answer very well for letterpress, will give but very imperfect work from engravings or cuts. It has been found wellnigh impossible to obtain satisfactory impressions from cuts or engraving-plates bent to the sharp curve required to correspond to printing-cylinders of the ordinary size.

These difficulties were overcome by increasing the diameter of the cylinder on which the plates for the cuts were placed, so that the curves to which the cuts or engravings were fitted might be gentler and of longer radius than the curve of the other printing-cylinders.

In 1878 there was built by Ingram, and exhibited at the Paris Exposition, a second machine, which had the cylinders of such size that three whole sheets could be printed at each revolution. The curvature of the plates was so slight that the printing was regarded as fully equal to that done on the ordinary flat surface.

The Campbell Web Perfecting-Press. In 1876, Andrew Campbell of Brooklyn, New York, con-

tracted to build for the *Cleveland Leader* a press from which twelve thousand copies could be printed in an hour, and constructed the first press that printed, inserted, pasted, folded and cut in one continuous operation.

A second press was built on the same pattern and exhibited at the Centennial Exposition of 1876. It was afterward erected in an office in Jersey City, where it is still at work. The machine is remarkably simple in construction. The type-cylinders, with their corresponding impression-cylinders, are placed in a perpendicular plane. The sheet is fed in at one end; it passes between the respective pairs of cylinders, and is then carried over an archway to the folding department, where it passes downward by successive stages until it reaches the delivery-board, folded and ready for the carrier.

The archway referred to is for the special purpose of giving easy access to the interior parts of the machine, as well as to the outer parts. It readily permits a man to stand up and work without injury while the press is in operation.

Only two of these presses were ever built, and both are still in use. Costly litigation was entered into against Campbell by the Hoe Manufacturing Company, which resulted in the company's purchasing of Campbell's patents and then shelving them.

This press is a marvel of simplicity and easy manipulation. The cylinders are very small, the parts few and the feeding of the web so gauged that the machine performs the best work with the least friction, noise and inconvenience.

The Scott Web Perfecting-Press. In 1879 Walter Scott of Chicago concluded to take up the Bullock where the ill-fated inventor and his able assistant had left off, and built a machine in Chicago with a capacity fifty per cent greater than any of its predecessors. He improved upon his own improvements, and in 1881 produced a press that would feed, print, cut, fold and deliver thirty-two thousand eight-page papers inside of sixty minutes.

The Scott press of 1890 is regarded as combining all the best features of any and every machine yet put before the public. The folding-appliances are especially simple and complete, and with a minimum of parts in general, the machine produces the maximum of results.

MAMMOTH PRESSES. The desire to build single machines that will produce the greatest number of papers in a given time has led to the construction, by various manufacturers, of "quadruple" and "sextuple" presses. They are simply machines of mammoth proportions, or, like the ten-cylinder rotary press invented by Napier and culminating in the once-celebrated Hoe Lightning, consist of a multiplication of cylinders and forms in the same general framework.

The largest machines of this kind are popularly designated as "Jumbos," and are simply mammoth in their construction. A press of this kind weighs about fifty-eight tons. It is ordinarily fed by three rolls of paper, each of 63 inches width. When under way the machine runs at the rate of fifty miles of white paper in an hour, and will print, cut,

fold and deliver 144,000 four-page papers in an hour.

While these monster presses perform prodigies of successful work, the slightest difficulty in any one part serves to paralyze the whole of the machinery, causing an uncomfortable delay, hence they are by many regarded with disfavor.

PRISM. See LIGHT, Vol. XIV, pp. 591, 592.

PRISMOIDAL FORMULA. See MENSURATION, Vol. XVI, p. 27.

PRISONS were once places of detention, where the accused or the convicted awaited final disposition. In time, imprisonment came to be in itself a punishment, the term of sentence measuring the turpitude of the offense. This stage in prison evolution is followed by another, in which the prison becomes a moral hospital for the curable, an asylum for the incurable. So is the history of prisons, in their purpose, written in outline; so, also, is written the history of prison architecture and criminal jurisprudence: for the prison-house has grown from a single cell, cage or dungeon into an educational institution; and a code of prevention is coming to take the place of a code of retribution, but only in a few localities and institutions has the evolution proceeded so far.

In the United States, where, shortly after the adoption of the Federal constitution, the penitentiary system "received its earliest and best expression," the history begins with the second stage, in which prisons are used chiefly, though sparingly, as a means of punishment, with laws that seek to adjust the penalty to the crime, that the sense of justice may be satisfied, the criminal himself deterred from further crime and others warned by his punishment. For the most part, the prisons and jails of the United States are still serving the same purpose. Reformatory influences are more generally employed; but it is nevertheless true, in spite of the reforms in which the United States have been foremost, in spite of the protest of our penitentiary system against the old penal theory, retribution in letter, if not in spirit, is the corner-stone of our criminal codes.

There are as many codes as states. No two codes agree throughout, either in the definition of crime or in the penalties prescribed for them, and these varying definitions and penalties not only reflect the varying conceptions of the relative seriousness of different crimes among different communities, but also show the sincerity of the effort on the part of law-makers to suit the punishment to the crime. This is certainly very generally true with respect to adult criminals of supposed sound mind. Children and defectives are usually dealt with on another principle. But for adults the breaking of law, if detected, must be punished by a sentence, within certain limits, in time, or by fine, or by both.

Many state institutions, and most jails and minor prisons, reflect the law in the treatment of prisoners, who are regarded, primarily, not as candidates for reformation, but as subjects for punishment. One authority speaks of county jails as "moral pest-houses, mere nurseries of infamy, where, without regard to age, sex, offense or sanitary laws, unfortunates are indiscriminately impounded."

There are notable exceptions, and it is pleasing to record that there is rapid progress in the adoption of a criminal code which recognizes the reformation of the convict as one of the primary objects of his separation from society, and which makes his social or antisocial attitude, his fitness for liberty, the determining factor in considering his return to society again. These principles were first notably employed in the state of New York, where there has been developed a remarkable institution, known as the Elmira Reformatory, under a law providing that individuals "of the age of 16 to 30 years, who are not known to have been previously sentenced to state's prison, may be sent to that institution for a term of imprisonment to be determined by the managers of the reformatory, but not to exceed, in any case, five years." The basic principle of this institution is the belief that criminals can be reformed, and that every prisoner must receive special treatment according to his need. The reformatory is educational in all its functions, seeking to develop every faculty of soul, mind and body. The reports of the institution show a probably complete reformation of over eighty per cent of those who are committed to it.

There are other institutions of this type, in the different states, at present—notably one for women at Sherborn, Massachusetts—and the system, in principle, has been adopted by Massachusetts, Pennsylvania, Ohio, Michigan, Illinois, Minnesota, Kansas and Colorado. Indeed, the principle of indeterminate sentence has now, in New York and Illinois, been carried to its logical limit, in that judges are deprived of the power of fixing even a maximum in pronouncing sentence.

In the United States there are 68 Federal and state prisons and penitentiaries, in few of which these principles have been applied, and nearly two thousand five hundred county jails, in most of which reformatory efforts are probably not attempted nor even possible. From these statistics the present status of prisons and prison discipline can be easily imagined.

The statistics presented in the different census reports seem to indicate an increase in the amount of crime. According to the latest census there were, in 1890, in all the prisons of the United States, 83,329 prisoners, as follows: In state prisons and penitentiaries, 45,233; in county jails, 19,861; in city prisons, 3,264; in workhouses and houses of correction, 9,968; leased out by counties, 2,308; in military and naval prisons, 794; in hospitals and asylums for the insane, 901. This is an increase of 23,720 over the reported number in 1880,—an increase in ratio from 1,169 to 1,000,000 of population in 1880 to 1,315 in 1890. It should be noted, however, that these figures do not make it certain that there has been an actual increase in the ratio of crime, nor that there has not been an even greater increase, for the reason that there are other elements in the problem affecting the result, such as changes in the laws, the varying interpretation and enforcement of these laws with the changing personnel of the courts, the varying efficiency of the police, etc. The census authorities warn against comparisons

with the reports of earlier decades, which many writers have drawn to show an alarming increase. The enumeration of the prison population prior to 1880 was very imperfect.

Attention should be called, also, to the fact that while the ratio of foreign-born whites to the total population is 16.59 per cent, the ratio of foreign-born white prisoners to the total number of prisoners is 27.8 per cent. Some of our penologists have placed as first among the causes which tend to promote the increase of crime, unrestricted immigration.

The state prisons and penitentiaries are most advanced in point of architecture and discipline. While the Old World was the birthplace of the penitentiary, it was in the United States that the idea was first and most satisfactorily expressed in a system. There are two systems of penitentiary discipline, known the world over as the Pennsylvania and Auburn, the first providing for the solitary confinement of the prisoner at hard labor, the latter providing for the separation of the prisoners by night only, and for their employment in shops together, but in silence, during the day. There are few, if any, penitentiaries distinctively of the first type in the United States to-day, though solitary confinement is employed at times in many of them as a special means of discipline. The Auburn system, with modifications, is in vogue in most penitentiaries. Out of these two systems has grown the Elmira system, noted above.

County jails and other minor prisons are, for the most part, poorly planned and poorly governed; their maintenance is expensive, and it is impossible to furnish employment, except in very limited amount and of trifling sort. The average number of inmates in a county jail is less than five, and many of these jails are nearly always empty. When the last census was taken, 589 of 2,460 jails were without occupants. Many of these jails are pretentious buildings, and costly residences are usually provided for the sheriffs. Most of the jails are so built as to make the separation or classification of the inmates impossible, and even in some cases to prevent the separation of the sexes.

In two states there are no penitentiaries or state prisons, the convicts being confined in camps, where they are employed by contractors under lease; in four other states, few of the convicts are kept within penitentiary walls, the rest being leased. The lease system, which has been attended by great cruelties, and by conditions which interfere with true reformatory work, is being gradually supplanted.

About two thirds of the total number of prisoners in the United States are reported as being employed while in prison. The chief occupations are making boots and shoes, clothing, furniture, chairs, wagons, barrels, brooms, brushes, agricultural implements, carpentering, mining, building railroads, stone and iron work, saddlery and farming.

The average age of prisoners is 30.65 years. About 75 per cent have no trade, and about 24 per cent can neither read nor write. See also PRISON DISCIPLINE, Vol. XIX, pp. 747-764.

JOHN H. FINLEY.

PRISTIDÆ OR PRISTIS. See ICHTHYOLOGY, Vol. XII, p. 686. RAY, Vol. XX, p. 299.

PRIVATE SCHOOLS. See SCHOOLS, PRIVATE, in these Supplements.

PRIVY SEAL. See MINISTRY, Vol. XVI, p. 473.

PRIZE-FIGHTING. See WRESTLING AND BOXING, Vol. XXIV, pp. 690, 691; and PUGILISM, in these Supplements.

PRJEVALSKY, NICOLAI MICHÆLOVITCH. See PREJEVALSKY, in these Supplements.

PROA, a narrow canoe thirty feet long and three feet wide, used by the natives of the Ladrone Islands. The stem and stern are similar, the boat sailing either way. The lee side is flat, so that the canoe resembles half of a vessel divided vertically in the line of the keel. Extending to leeward is an outrigger, consisting of a frame, at the end of which is a floating canoe-shaped timber, which prevents the narrow proa proper from tipping.

PROBATE. See WILL, Vol. XXIV, p. 570.

PROBOSCIDEA, a family of insects. See DIPTERA, Vol. VII, p. 256; and MAMMALIA, Vol. XV, pp. 423-427.

PROBOSCIS MONKEY. See APE, Vol. II, p. 151.

PROCARP, a name given to the peculiar female organ of the red seaweeds (*Floridæ*), in which no gamete (*oosphere*) is differentiated; also called *carpogonium* or *carpogone*.

PROCEDURE. See EVIDENCE, Vol. VIII, p. 738; LAW, Vol. XIV, p. 358; and PLEADING, Vol. XIX, p. 217.

PROCELLARIDÆ, a family of birds of the order *Tubinares*, which comprises the tubenosed water-birds. They are gull-like pelagic birds. The family includes the petrels and the albatrosses. There are about ninety species in all the seas.

PROCESSION OF THE HOLY SPIRIT, a dogma disputed between the Eastern and Latin churches, arising out of the introduction of the words *filioque* into the Nicene Creed. See GREEK CHURCH, Vol. XI, p. 156.

PROCLUS, a philosopher. See NEO-PLATONISM, Vol. XVII, p. 338.

PROCNE. See NIGHTINGALE, Vol. XVII, p. 499.

PROCONSUL. See CONSUL, Vol. VI, p. 315.

PROCRUSTES. See THESEUS, Vol. XXIII, p. 294.

PROCTOR, REDFIELD, an American public man; born in Proctorsville, Vermont, June 1, 1831. He was graduated at Dartmouth College in 1851, and was admitted to the bar of Massachusetts in 1859. He practiced his profession in Boston until the beginning of the Civil War, when he entered the Union army and remained in active service until 1863. He attained the rank of colonel; returned to Vermont and began practice there; entered politics and held the following offices: Member of the state legislature (1867-68); of the state senate (1874); lieutenant-governor of Vermont (1876-78); governor (1878-80); Secretary of War (1889-91); and since 1891 United States Senator from Vermont.

PROCTOR, RICHARD ANTHONY, a British astronomer; born in Chelsea, England, March 23, 1837.

He graduated at St. John's College, Cambridge, in 1860; was appointed an honorary fellow of King's College, London, in 1873, and fellow of the Royal Astronomical Society in 1866. He was appointed honorary secretary of that society and editor of its proceedings in February, 1872, but resigned these offices in November, 1873. Having analyzed results collected by the Herschels, Struve and others, and carried out a series of original researches, including the construction of a chart of 324,000 stars, Mr. Proctor was led to a new theory of the structure of the stellar universe; investigated the conditions of the transits of Venus in 1874 and 1882, and published many illustrative charts. He was one of the most popular astronomical writers, and his productions are numerous, covering other than professional topics in some instances. In 1879 Mr. Proctor left England for America and Australasia. He lectured in all the principal towns of Victoria, New South Wales, South Australia, Tasmania and New Zealand. He started *Knowledge* as a weekly journal in 1881, but altered it to the monthly form in 1885. He published a large number of volumes on astronomical and kindred subjects, besides compiling various hand-books of the stars and star atlases. He also wrote a notable work on *The Great Pyramid: Observatory, Tomb, and Temple* (1883), which elicited considerable controversy. His chief writings are *Other Worlds than Ours* (1870); *Orbs Around Us* (1872); *Light Science for Leisure Hours* (3 series, 1871-78); *Myths and Marvels of Astronomy* (1877); *Half-Hours With the Telescope* (1868); *Saturn and Its System* (1865); and *Old and New Astronomy* (1888). He contributed the article on ASTRONOMY to this ENCYCLOPÆDIA. He died in New York City, of yellow fever (contracted in Florida), Sept. 12, 1888.



RICHARD A. PROCTOR.

PROCURATOR. See PROCTOR, Vol. XIX, p. 792.

PROCYONIDÆ. See MAMMALIA, Vol. XV, pp. 440, 441.

PROFILOMETER, an instrument used for measuring the face, consisting of parallel rods bound in a frame so that they may be slipped in and out.

PROFITS. See POLITICAL ECONOMY, Vol. XIX, p. 367.

PROFIT-SHARING. See CO-OPERATION, Vol. VI, p. 340.

PROGRESSION. See ALGEBRA, Vol. I, pp. 536, 537.

PROGRESSIVE FRIENDS. See FRIENDS, SOCIETY OF, in these Supplements.

PROHIBITION LAWS. See LIQUOR LAWS, in these Supplements.

PROHIBITION PARTY. Although the temperance movement began in the United States as early as 1812, it was not till about 1851, when the famous "Maine Law" was passed, that prohibition

became prominent. The example set by Maine was quickly followed by Vermont in 1852, Rhode Island in 1852, Connecticut in 1854, New Hampshire in 1855, New York in 1855, Michigan in 1855, Iowa in 1855—a belt of states settled almost exclusively by New England people. Some of these states, as Rhode Island, New York, Connecticut and Michigan, subsequently repealed their laws; but the idea was started and grew slowly, but surely, as a state issue. After the war the movement became especially active, and prohibition parties began to appear in several states.

The first step toward a national party was taken at a convention of the Right Worshipful Grand Lodge of Good Templars, held at Oswego, New York, May 25, 1869, where a committee was appointed to call a national convention of prohibitionists. This convention met at Chicago, Sept. 1, 1869, and founded "The National Prohibition Reform Party." The first national convention was held at Columbus, Ohio, Feb. 22, 1872, where James Black of Pennsylvania was named for President and John Russell of Michigan for Vice-President. Nine states were represented by 194 delegates. At the election in November 5,608 votes were polled.

From this humble beginning the party has steadily grown. In 1876 it nominated Green Clay Smith, and polled 9,522 votes. In 1880 Neal Dow received 10,305 votes in eighteen states. The strength of the party then lay in Ohio, Pennsylvania and New York, in the order mentioned. But 380 votes were cast for it west of the Mississippi, and but 308 south of Pennsylvania and the Ohio River. But in the general breaking up of parties and the rise of new issues which marked the years 1880 to 1884, the Prohibition party gained immensely. It now declared for woman suffrage, and at the national convention held July 23-24, 1884, at Pittsburg, admitted women delegates. John P. St. John of Kansas and William Daniel of Maryland were nominated on a platform demanding the abolition of the collection of revenue from alcoholic liquor and tobacco; that the liquor traffic be prohibited in all places over which the government has control; and that no new state be admitted to the Union unless its constitution prohibit polygamy and the manufacture and sale of liquor. The vote polled was 150,369 in 34 states.

The party strength now lay in Massachusetts, New York, Pennsylvania, Kansas and Illinois, in the order in which they are named.

When 1888 came, the party, more prosperous than ever, held a national convention at Indianapolis, May 30th; nominated Clinton B. Fisk of New Jersey and John A. Brooks of Missouri, and added to its old platform a demand for woman suffrage, reform of the immigration laws and the protection of the American Sunday. The vote polled was 250,290, South Carolina being the only state in the Union wherein no votes were cast for Fisk. The strength of the party was now in the Northwest; it was a strong third party, outranking the Labor party in votes. In 1892 the convention sitting at Cincinnati chose John Bidwell of California and

James B. Cranfill of Texas as its candidates, and polled 279,191 votes. Its platform was made up of issues of the day, as government ownership of railways, revision of the immigration laws, prohibition of alien ownership of land, female suffrage, the Australian ballot, and, of course, no liquor traffic.

The seventh national convention met in Pittsburg, Pennsylvania, May 27-28, 1896. There were two factions, known as "narrow-gauge" and "broad-gauge," composed respectively of those who favored a platform which would have but a single plank, the prohibition of the liquor traffic, and those who were of the opinion that the party should take into account the various political and socialistic differences at the time, including the doctrine of free silver. The "narrow-gauge" men made up three fourths of the eight hundred delegates, and therefore prohibition was made the only issue of the platform. Two hundred of the opposing faction then "bolted" the convention and organized themselves into the "National Party" in another hall. The Prohibitionists proper then nominated Joshua Levering of Maryland for President and Hale Johnson of Illinois for Vice-President. The "National Party," adopting a platform which advocated, in addition to prohibition, free silver, abolition of banks, government ownership of railways, etc., nominated Charles E. Bentley of Nebraska and J. H. Southgate of North Carolina. In the election which followed in November, the Prohibitionists polled 130,560 votes and the "National Party" candidates 14,392 votes.

J. B. McMASTER.

PROJECTILES. See **GUNNERY**, Vol. XI, pp. 304, 305; and **GUNNERY**, in these Supplements.

PROMISE. See **CONTRACT**, Vol. VI, p. 322; and **AGREEMENT**, in these Supplements.

PROMISE, BREACH OF. See **WOMEN**, Vol. XXIV, p. 643.

PROMISSORY NOTE. See **BILLS OF EXCHANGE**, Vol. III, pp. 673, 674.

PROMORPHOLOGY. See **MORPHOLOGY**, Vol. XVI, p. 843.

PRONGHORN OR PRONGBUCK. See **ANTELOPE**, Vol. II, p. 102.

PRONOUNS. See **GRAMMAR**, Vol. XI, p. 37.

PRONUNCIATION. See **GREECE**, Vol. XI, p. 135; **LATIN LANGUAGE**, Vol. XIV, pp. 330, 331; and *Phonology*, under **PHILOLOGY**, Vol. XVIII, pp. 787-789.

PROOF OF FIREARMS. With a view to the public security, the proving of all barrels for English small arms is rendered compulsory at the proof-house of either London or Birmingham. The proof consists in firing them with heavier charges than they are made for. Rifle-barrels are proved twice: 1. After boring, with three times the ordinary charge of gunpowder, and a heavy bullet, and 2. After rifling, with the lock attached, the charge being reduced one third. When the rifle is quite complete it is again tested with its proper charge. Ordnance is submitted to a very searching proof by firing very heavy and gradually increasing charges. In America every well-made rifle, shotgun or revolver is subjected to severe proof tests.

PROOF-READERS' MARKS, corrections indicated for the printer, on proof-sheets, which may be said to consist of two parts: 1. The body of type, which is to be corrected; and 2. The broad white margin, on which the corrections are marked. The technical marks employed to correct errors by compositors have been the same from the infancy of the art of printing until the present day, and by long use have approved themselves to all who read for the press. There are few industrial occupations demanding more exacting application than proof-reading. There can be none in which wide reading and general knowledge are more useful. But qualities more than these are required to make a good proof-reader. In the first place, a practical knowledge of the whole of the art of printing is almost a *sine quâ non*. The discernment of bad style, of wrong use of type, and a myriad matters also, can only be acquired by long practical training in a printing-office. Here a proof-reader's work is long, trying to the eyes, and exhaustive of nervous energy, even if it be well paid. Many a scholarly man at such a task might exclaim with one poetic corrector:

"Oh, but to 'dele' work!
To 'transpose' toil for rest!
To 'make up' life's remaining years
On smiling Nature's breast!
A 'space' of time to join the 'chase,'
Some 'quoins' to see me through;
A short 'fat take,' at least, I want,—
A few small 'notes' might do."

It would tax the limits of an encyclopædia article, and transgress the province of a technical work, to attempt to explain all the details of the art of printing under the present title. Necessarily required to be understood by a practical and professional proof-reader, they are outside the province of the author or business man finally revising proof for the printer. In such a case the matter has, in most instances, already passed through the hands of an expert proof-reader before it reaches the author. The latter, desiring to make further changes or corrections, requires merely such a superficial knowledge of proof-reading and a familiarity with the technical signs, symbols, abbreviations, and contractions employed as will enable him to express his desires in form intelligible to the printers charged with giving effect to them. For such a one this article and its sample proof-sheets are intended.

A proof comes from the printer in "galley" form, having in the top right-hand corner its consecutive number, and with it printers usually send printed directions to non-professional proof-readers, in terms like the following:

1. Read carefully, ESPECIALLY for errors in NAMES, ADDRESSES, and technical words.
2. Return the ORIGINAL COPY with the proof.
3. Write on proof order for NUMBER OF COPIES WANTED, if not already given.
4. Mark "O.K.," or "O.K. with alterations," as the case may be, signing your name, so we may know that proof has reached the proper person.
5. Don't send verbal explanations by message-boy when it is possible to write them.

An observance of these few hints will prevent most of the errors likely to occur.

Such a proof-sheet as No. 1, following, necessarily has to carry far more errors than usual in any well-composed or corrected proof reaching an author, in order to exhibit the methods of correction. Proceeding to consider and correct the errors in sequence and detail, it may be, in the first place, remarked that there are two general classes of correction-marks: 1. Those marked in the body of the type, to point out the exact location of any needed correction; 2. Those written in the margin, to show the nature of the correction desired to be made. In their turn, each of these is subdivided; the marks inserted in the type comprising,—*a*. Strokes drawn through letters, words, or marks of punctuation; *b*. Carets and inverted carets; *c*. Horizontal curves; and *d*. Under-scoring with lines and dots. The signs used in the margin may be classified as,—*e*. Words, letters, punctuation, etc., that are intended to take the place of errors in the type, or to supply omissions; *f*. Abbreviations of such terms as "transpose," "wrong font," etc.,—words which indicate to the compositor the kind of error that has been committed; and *g*. Certain conventional signs which have come down from the early days of the art of printing. These two classes of signs should always be used in conjunction. Every error marked in the type must have a corresponding mark in the margin, to attract the compositor's attention. No mark should be made in the margin which has not some corresponding mark in the type. But the two classes of marks must be kept in their proper places. In the type are to be placed *only* those marks which indicate the place at which an error has been made. The margin is reserved for marks denoting the nature of the desired correction.

Though the errors which are possible of occurrence in the setting of type, whether from poor copy or careless or incompetent compositors, are numerous, all, or nearly all, of them may be classified and arranged under the following heads: 1. The need of insertion of new or omitted matter; 2. The expunging or striking out of letters, signs, or matter improperly inserted; 3. The substitution of other letters, signs, or matter in the place of errors; 4. Transposition; 5. Inversion; and 6. Spacing.

The errors, and method of correcting them, are illustrated in plate No. 3. In the explanation which follows, the numbers which stand at the heads of paragraphs refer to the corresponding numbers in the plate.

EXPLANATION OF THE CORRECTIONS. Line 1. The centering of a heading. *In the type*: The sign], drawn approximately where the end of the heading should come, with the open side of the sign toward the type. *In the margin*: The word "center."

Line 2. The use of an ornament too small to conform to good style. *In the type*: A horizontal line under the ornament. *In the margin*: The words "larger ornament." The use of an ornament in line 5 requires a distinction in size.

Line 3. The use of a heading too small in type-size, in proportion to the size of the page. *In the type*: The type underscored by a single horizontal line. *In the margin*: The word "larger," or specific and technical description of the size and face of type desired,—for the latter a knowledge of printing is necessary.

NO. 1.—UNCORRECTED PROOF.
SPECIMEN-SHEET.

POETS, SAGES, WARRIORS.

[Uniform with The Historians Series.]

Sage of Concord (The), RALPH WALDO EMERSON, Boston, United States, author of *Literary Ethics* (1838), *Poems* (1846), *Representative Men* (1850), *English Traits* (1856), and numerous other works (1803-1882)

"In Mr. Emerson we have a poet and a profoundly religious man who is really and entirely undaunted by the discoveries of past, present, or prospective, science. In his case, poetry, with the joy of a bacchanal, takes her graver brother science by the hand, and cheers him with immortal laughter.

By Emerson scientific conceptions are continually transmuted into the finer forms and warmer lines of an ideal world." PROFESSOR TYNDALL, *Fragments of Science*. "No one who has conversed with the Sage of Concord can wonder at the love which his neighbors feel for him, or the reverence is regarded by the scholars of England and America."—*Newspaper Biographical Sketch*, May, 1879.

Sage of Monticello (The), THOMAS JEFFERSON, the third president of the United States, whose country seat was at Monticello.

As from the grave where Henry sleeps,
From Vernon's weeping willow,
As from the grassy pall which hides
The Sage of Monticello,
* * * * *

Virginia, o'er thy land of Slaves,
A warning voice is swelling.
WHITTIER, *Voices of Freedom* (1835).

NO. 2.—CORRECTED AND REVISED PROOF.
SPECIMEN-SHEET.

POETS, SAGES, WARRIORS.

[Uniform with the Historians Series.]

Sage of Concord (The), RALPH WALDO EMERSON, Boston, United States, author of *Literary Ethics* (1838), *Poems* (1846), *Representative Men* (1850), *English Traits* (1856), and numerous other works (1803-1882).

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The Sage of Monticello, . . .
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Line 4. Italics to Roman. *In the type:* One line under the words to be changed. *In the margin:* The abbreviation "Rom."

Line 6. Change of font. *In the type:* A stroke under or through the letter or word to be changed. *In the margin:* The abbreviation "w.f." ("wrong font"). The letter g in the word **Sage** is lighter-faced than the other letters, as will be seen by comparison.

Roman to Italics. *In the type:* One line under the word to be changed. *In the margin:* The abbreviation "Ital."

The insertion of an omitted hyphen. *In the type:* A caret, ^, at the point where the correction is desired. *In the margin:* A hyphen between slanting strokes; thus, //.

Lines 7-8. The insertion of an omitted "lead." *In the type:* A caret, ^, the apex pointing between the lines where the lead has been left out. *In the margin:* The abbreviation "ld." for lead, written in the angle of the caret.

Line 9. The substitution of a perfect for a defective type. *In the type:* A line under or through the defective letter. *In the margin:* A small cross, x.

Line 10. The insertion of an en-dash instead of a hyphen between connected and inclusive dates. *In the type:* A stroke through the hyphen. *In the margin:* An en-dash between slanting lines; thus, //. For greater certainty as to the kind of dash desired, most proof-readers write "en-dash" as well.

The insertion of an omitted period. *In the type:* A caret, ^, at the place of omission. *In the margin:* A period encircled by a ring; thus, ○.

Line 11. Indenting for a paragraph. *In the type:* A caret, ^, at the place where the indentation is to be made. *In the margin:* A square, □. Another marginal sign for a paragraph is made thus: ¶.

Lines 11-12. The wrong division of a word. *In the type:* A stroke through the letters out of place and a

caret, ^, where they should be inserted. *In the margin:* The dele, or sign of omission, δ (the dele—a Latin imperative meaning "destroy"—is made in a variety of ways, all resembling, in some degree, the Greek letter δ), and the expunged letter or letters inserted opposite its appropriate line, followed by a slanting stroke.

Line 12. The correction of improper spacing between words or letters. *In the type and margin:* Inverted carets, vvv.

Line 13. A transposition desired. *In the type:* A circle is thrown about the word, and a line carried between the type lines to a caret at the point where the insertion is to be made. *In the margin:* The abbreviation "tr."

To transpose two words. *In the type:* A line passed over the first word and under and around the second. *In the margin:* The abbreviation "tr."

Transposing letters. *In the type:* A line under the letters to be transposed. *In the margin:* The abbreviation "tr."

Changing the order of several words. *In the type:* Numbers placed over the words to be transposed, so as to indicate the order in which they are to be arranged. *In the margin:* The abbreviation "tr."

In transposing letters a curved line is sometimes passed above the first and below the second.

Change of punctuation. Comma to period. *In the type:* A stroke through the comma. *In the margin:* A period inclosed in a circle. Period to comma. *In the type:* A stroke through the period. *In the margin:* A comma, followed by a slanting stroke.

Line 14. Depressing a space. *In the type:* A line through the space. *In the margin:* A vertical dash resting on a shorter horizontal dash (or semicircle).
↓ ↓. (Spaces and quads (or quadrats) are pieces of type-metal used to space out the lines of type. Although not as high as the pieces bearing the type-faces, they sometimes are elevated so as to appear in the proof.)

NO. 3.—PROOF-SHEET AS CORRECTED BY PROOF-READER.

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SPECIMEN-SHEET.]

POETS, SAGES, WARRIORS.

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The Sage of Monticello,

Virginia, o'er thy land of slaves,
A warning voice is swelling.

WHITTIER, *Voices of Freedom* (1835).

center

larger ornament

12th O.S. Aut.

Rom.

Ital. #

run in

sm. caps.

l.c.

Change of type. Lower-case to capital. *In the type:* A stroke through the letter to be changed. *In the margin:* The abbreviation "cap," or the letter with three lines thereunder and a slanting line; thus, *cap*. (Small letters are called, by printers, lower-case letters; capitals and small capitals, upper-case letters. A change from upper to lower case is indicated by underscoring once the word in the type and writing the abbreviation "l.c." in the margin. The common method of indicating a change from a lower to an upper-case letter is to draw a line through the letter in the type, and to place in the margin the same letter underscored twice for small-capitals and thrice for capitals. See also line 24.)

Line 15. A letter inverted. *In the type:* A stroke under the inverted letter. *In the margin:* The inversion-sign, *Q*.

Line 16. The insertion of an omitted letter. *In the type:* A caret, *^*, showing the point at which the letter is to be supplied. *In the margin:* The omitted letter, followed by a slanting line.

Lines 16-17. Two separate paragraphs to be united in one. *In the type:* A curved line drawn from the end of the first paragraph to the beginning of the second. *In the margin:* "No ¶." The words "run in" are also, and frequently, used.

Line 17. Insert space between words. *In the type:* A caret, *^*, or slanting stroke, */*, between the letters to be separated. *In the margin:* The sign *#*.

Line 19. The insertion of an em-dash. *In the type:* A caret, *^*, at the place where the omission is to be supplied. *In the margin:* An em-dash between slanting lines; thus, *-*.

The commencement of a fresh paragraph. *In the type:* The sign *[*, marked where the paragraph should begin, with the open side of the sign toward the trend of the type. *In the margin:* The sign *¶*.

Line 20. The elision of a repeated word, called a "doublet." *In the type:* A stroke drawn through one of

the words constituting the doublet. *In the margin:* The dele-mark, *δ*.

Lines 21-22. To take out a lead improperly inserted. *In the type:* A caret, *>*, between the lines, with the apex pointing away from the lines in question. *In the margin:* The dele-mark, *δ*, and the abbreviation "ld." (*δ* ld.).

Line 22. The insertion of an omitted clause. *In the type:* A caret, *^*, showing the point at which the words are to be supplied. *In the margin:* The omitted clause, from which is drawn a line to the caret in the type.

When the omitted passage is so long that to rewrite it in the margin would be a waste of time, the printer is referred to the original manuscript. In such case a caret is placed in the type and the words "out, see copy, page—" (giving the folio of the copy), or "out, s.c.," are written in the margin. In the manuscript the omitted words should be inclosed in brackets, preferably with a colored pencil, and "out" written at the place of omission.

Lines 22-23. Straightening crooked lines of type. *In the type:* The depressed words or letters inclosed by parallel lines. *In the margin:* Short parallel lines, with their ends pointing toward the type, *||*.

Line 23. The elision of a hyphen between words and the closing up of the improperly compounded word. *In the type:* A slanting line drawn through the hyphen, with the sign *∩*, close up, above and below. *In the margin:* The double mark *∩*.

Line 24. The changing of lower-case to small capitals. *In the type:* Two lines under the words to be changed. *In the margin:* The abbreviation "s. caps.," or "sm. caps." See also line 14.

Line 25. The capitalization of a letter. *In the type:* A slanting line through the letter. *In the margin:* The capital letter desired, with three lines drawn under it and followed by a slanting line; thus, *g*.

The substitution of one letter for another. *In the type:* A stroke through the letter. *In the margin:* The letter

which is to be substituted for that in the type, followed by a slanting line. (The slanting line serves both to attract the printer's eye and to separate one letter or word from another, in case two or more corrections are made in the same line of type.)

Line 26. The uniting of improperly separated parts of a word. *In the type:* Horizontal curves, , inclosing the separated parts. *In the margin:* Horizontal curves, .

The restoration of a word which has been stricken out. *In the type:* A line of dots under the word. *In the margin:* The Latin word *stet* ("let it stand").

Line 27. The insertion of quotation-marks, or inverted commas. *In the type:* A caret, , at the point where the quotation-marks, or inverted commas, are to be inserted. *In the margin:* Quotation-marks, or inverted commas, in an inverted caret, . (The inverted caret serves to distinguish the apostrophe from the comma. Sometimes an inverted caret is used in the type as well as in the margin.)

Line 29. A dirty or "filled" letter. *In the type:* A stroke under the defective letter. *In the margin:* A small cross, .

Line 30. The insertion of three spaced periods at the end of line 30, instead of the line of asterisks in line 31, to mark an intentional hiatus, or omission. *In the type:* A line through the asterisks. *In the margin:* Line 30, three spaced periods in a ring; line 31, the *dele*-mark, . This alteration is one made for style and neatness.

Line 32. The substitution of an exclamation-mark for a comma. *In the type:* A slanting stroke through the comma. *In the margin:* An exclamation-point in an inverted caret; thus, .

Line 33. The insertion of apostrophes at end of quotation; thus, . See line 27, *ante*.

The page, when marked, is returned to the printer, who proceeds to make all necessary corrections. No. 2 shows the proof when corrected and clean. The compositor is usually paid by time for making corrections, and a serious item of expense will be incurred by numerous or unnecessary alterations. In some offices a ring or loop is drawn round the marginal mark of an error which is not the fault of a compositor.

A few general suggestions are necessary.

The question of the divisions of words into syllables should be settled by reference to a dictionary. As a rule, not more than three syllabic divisions are allowed in consecutive lines, unless, in very narrow columns, more are absolutely inevitable.

In cases of doubt, strike out the matter to be corrected and rewrite it in the margin exactly as it should appear in the type.

The logotypes *fi*, *ffi*, are used instead of the separate letters *fi*, *ffi*. When *æ* is desired in place of *ae*, it is indicated by a horizontal line or curve above the two letters.

The following errors are somewhat difficult of detection: 1. Changes of font, when the types of the two fonts are much alike; 2. Inversion of *s* and *x*; 3. The occurrence of inverted *n*, *u*, *b*, and *p*, for *u*, *n*, *q* and *d*, respectively.

Differences in fonts can be learned only by experience. The principal differences are in the shape of the letters, the thickness or blackness of the lines, and the size of the face.

Inverted *s* and *x* may be detected by the fact that the lower part of these letters is slightly larger than the upper part.

The main differences between *n* and inverted *u*, *b* and inverted *q*, *d* and inverted *p*, lie in the small projections called serifs which start at right angles from the sides or stems of these letters. For example, in *n* the serifs, or projections, at the bottom of the letter are seen on both sides of the prongs or "legs." In *u* the projections are seen on but one side. The differences in the other pairs of letters will be readily detected upon examination.

Other inversions for which it is well to be watchful are those of the letter *o*, the cipher, the period, the comma and the colon.

The spacing of the punctuation requires some care:

Notice that the comma follows immediately the preceding word, but is separated by a slight space from the word that follows; that the semicolon and colon stand a little way off from the preceding word; that the period is followed by a considerably greater space than the other points.

Type is set either "solid," that is, without spacing between the lines, or "lead," that is, with the lines separated by thin strips of type-metal, known as "leads." When but one "lead" is used between each pair of lines, the type is said to be "single-leaded"; when two "leads" are used, the type is said to be "double-leaded." Errors in leading are of two kinds: 1. Omitting leads; and 2. Inserting them where they are not needed. See lines 7-8, 21-22, *ante*.

Words may be carried up or down, to the right or left, by means of brackets placed about the words and repeated in the margin. The significance of the brackets is as follows:  means "carry to the right";  means "carry to the left";  means "move up";  means "move down."

Corrections are made in the margin nearest which they occur. If the corrections are numerous, it is well to draw lines from the marks in the type to those in the margin.

The bibliography of proof-reading is that of the art of printing, of which it forms a part. Mention may be made of A. N. Sherman's *Printers' Manual* (1834); MacKellar's *American Printer*; *The American Dictionary of Printing and Bookbinding*; William Blades's *Pentateuch of Printing*; Marshall T. Bigelow's masterly *Handbook of Punctuation* (1890); and John Wilson's exhaustive *Treatise on Punctuation* (1864).

PROPERTY. See PERSONAL ESTATE, Vol. XVIII, pp. 664, 665; and REAL ESTATE, Vol. XX, pp. 304-308.

PROPHYLLUM, a botanical term applied to those bracts in an inflorescence which are borne on the pedicels of individual flowers; also called *bracteoles*.

PROPIONIC ACID, one of the fatty series, having the formula C^3H^5COOH . It gets its name from the fact that it is the first or simplest of the acids of this series, which have the fatty feel characteristic of the higher acids of the same series. It is formed in the fermentation of malate and lactate of lime, and can also be prepared synthetically; perhaps it is best made by the oxidation of propyl alcohol. It is formed in some fruits, in pyroligneous acid, and in smut.

PROPOLIS. See BEE, Vol. III, p. 489.

PROPORTION. See ARITHMETIC, Vol. II, p. 535.

PROPYLITE. See GEOLOGY, Vol. X, p. 235.

PROSECUTOR, one who institutes or conducts a criminal prosecution against another. A private prosecutor is one who institutes a criminal proceeding, or prefers a charge of crime. A public prosecutor is an officer representing the public, and whose duty it is to conduct criminal prosecutions. These officers are variously denominated as attorney-general, state's attorney, prosecuting attorney, and the like. Any one familiar with the facts may prefer a criminal charge, and if done in good faith, and with reasonable and probable cause for making the charge, such person will not be held liable in damages, even if mistaken.

PROSIMIÆ. See LEMUR, Vol. XIV, pp. 440, 441.

PROSOBRANCHIA, one of the three orders of

gastropod mollusks. Recent authors include in the order those gastropods with the gills in front of the heart and with the auricle in front of the ventricle. The nerve-cords are crossed, hence the old name of the group, *Streptoneura*, meaning twisted nerves. The second order of gastropods, as now classified, is the *Opisthobranchia*, which in the above-named characters is opposed to the *Prosobranchia*. The third order, *Pulmonata*, includes all the forms which have no gills, but breathe directly. This is an adaptation to a life more or less terrestrial. The group, *Euthyneura*, as used in this ENCYCLOPÆDIA, includes the last two orders, which have the nerves not crossed.

PROSODY is, to a great extent, an artificial growth. The writers of the classical period found the language of Italy with a strong tendency toward modernization. The final consonants were being dropped, and syllables slurred over, so that the spoken language was beginning to show considerable divergence from the written language. Cicero ridicules the rustic pronunciation of *cauneas* for *cave ne eas*, and Plautus more than once scans *cavēto* as a dissyllable. Side by side with this shortening, there exists an excessive number of long syllables in the older Latin, which made the verses written extremely heavy and monotonous,—a defect which is compensated, however, by the tendency to let the accent dominate the natural quantity, as in modern languages. Thus we get such words as *supēllectilem*, *senēctutem*, with long syllables shortened to suit the requirements of the line. The writers of the classical age saved the language from the process of phonetic decay which was setting in, at least as far as regards the language of literature, and fixed a standard for the quantity, which is, with a very few exceptions, rigorously adhered to. Thus the final *a* and *e* were in most cases used short, ablatives and some adverbs being the commonest of those which were left long. The other final vowels are almost always long. Of consonantal endings, *t*, one of the commonest, which was often long in the time of Ennius, as in the heavy line,

noenum rumores ponebat ante salutem,

is invariably used short; *s*, the other most frequent termination, is preceded by *a*, *e*, and *o*, with a long quantity, *is* and *us* being, as a rule, short, except dative and ablative cases in *is*, and some nominatives in *us*, where the vowel remains throughout the inflexions. On the other hand, two consecutive consonants always lengthen a vowel which precedes them except in certain combinations of *a* mute followed by a liquid. This is also the case in Greek, but there there is a greater elasticity in shortening the vowels.

The Romans were not naturally a people of poetical temperament, and borrowed their metres, as indeed they did everything connected with art, from the Greeks,—a fact which is illustrated by the curious epithet *doctus*, applied to poets. The oldest form of verse, however, the Saturnian, seems to be indigenous. It consists of a rising rhythm of three iambs, with a pause, and then a falling rhythm of three trochees; as,

dabunt malum Metelli | Nævio poetæ.

We have the same metre in the old nursery rhyme:
The queen[^] wasin[^] her par[^]lor | 'eating bre[^]ad and
ho[^]ney.

The comic poets Plautus and Terence take their metres from the Greek stage, using them in such a way as to come as near as possible to the language of ordinary conversation, especially the trochaic tetrameter and the iambic senarius, which lend themselves particularly well to this. The first line of the *Aulularia* is a good example of a homely sentence which, by means of six elisions, contrives to scan as an iambic line:

Exi, inquam: age exi: exeundum hercle tibi est hinc foras.
(Get out, I tell you! out of the house at once, by Jove!)

The metre will be seen by reading the line thus:

Exìnqu | àgèx' | exéundè | herclètìb | est hínc | forás.

The last foot only, in this style, must be a genuine iambus, and the short syllable in the second and fourth feet, which are necessary in the Greek iambic metre, are constantly dispensed with.

For long poems the hexameter was always taken both by Greek and Latin writers, owing to its dignified and sustained effect. The grand roll of the Homeric line has not been reproduced in Latin, and the metre has not been found to adapt itself to English words. Its development, however, in the hands of Virgil was very marked. Lucretius, no doubt, handled it far more freely than his predecessors, but considering the short interval between the two men—33 years between the dates of their deaths—the difference of sound and rhythm is remarkable. This is not to be accounted for by the subject-matter; for though Lucretius is writing on philosophy, he is imbued with the spirit of poetry, and wherever it is possible, his language is as picturesque as that of any poet, and the dignity and grace of his opening lines in more than one book make one wish that he had not felt constrained to deal with such a theme and to state it with such uncompromising clearness. The rhythm of Lucretius compared with Virgil might be described as *staccato* compared with *sostenuto* in musical phraseology. The reason of this is, that the older poet not only does not admit so much variety of rhythm, but makes the rhythm seem to end at the end of each line, even though the sentence may not stop there. Again, he is not so particular about keeping the *cæsure*, or definitely marked break in sound, in the middle of the line, and has no hesitation in ending with words of one or four syllables,—a thing which Virgil only does with a purpose. For example:

At quoniam supra docui nil posse creari

De nilo neque quod genitum est ad nil revocari,
Esse immortali primordia corpore debent,
Dissolui quo quæque supremo tempore possint,
Materies ut subpeditet rebus reparandis.—*Lucr.* i, 543.

Here, in the second line, the accent does fall naturally on *nil*, but in the last, *rebús* has the accent thrown forward on to a naturally short vowel with bad effect, and the unbroken *subpeditet*, in the middle, divides the line into three pieces instead of two, making it sound like a piece of prose whose quantities accidentally convert it into a hexameter.

Turning now to Virgil, we come to one of the greatest masters of rhythmical style in any lan-

guage. He writes, not line by line, but sentence by sentence, hence there is an even flow of words from one verse to another, and monotony is avoided, not only by the artistic arrangement of words, but by the variety of the pauses. He marks the *cæsura* invariably, and hardly admits a quadrisyllable at the end; if he does so, it is usually a proper name, as "in Actæo Aracyntho." Monosyllables are used sparingly, and then with strong effect, as in the line describing the rise and breaking of a large wave,

Insequitur cumulo præruptus aquæ mons,

where the dactyls at the beginning show the water rising by leaps until the heavy sea crashes down upon the ill-fated ship with one tremendous syllable. Another similar termination, which, indeed, he has worked rather hard, is the *procumbit humi bos*. There is a very descriptive combination of swift dactylic rhythm and pause in *Æneid* ii, where the Trojans defending Priam's house loosen a turret and heave it over upon their assailants, which is worth quoting in full:

convellimus altis
Sedibus impulimusque; ea lapsa repente ruinam
Cum sonitu trahit et Danaum super agmina late
Incidit.—*Æn.* ii, 495.

The sharp pause at *impulimusque* marks the moment while the masonry hangs tottering; then follows a line and a half of short syllables as it falls with seemingly increased rapidity, closing abruptly on a short syllable, as though broken into pieces. Equally effective, too, are his slow-moving spondaic lines, as, at the descent into Inferno

Ibant obscuri sola sub nocte per umbram.
—*Æn.* vi, 268.

and the dignity of a long word following a trochee at the beginning of a verse; as,

Quique sacerdotes casti . . .

or

Jura magistratusque legunt . . .

The elegiac couplet consists of a hexameter and the so-called pentameter, which is the first half of the hexameter line repeated twice, with dactyls only in the latter half. Longfellow has used it with success as a choric metre in his *Masque of Pandora*, but adding rhyme:

These are the Voices Three, That speak of endless endeavor;
Speak of endurance and strength, Triumph and fullness of fame:
Sounding about the world, An inspiration forever,
Stirring the hearts of men, Shaping their end and their aim.

It is seldom that the sentence continues from one couplet into another, and, as a general rule, each line is complete in itself. Ovid is the great master of this style, and by a comparison of him with Catullus before him and Martial after him, as well as with Greek models, we find that he allows himself much less latitude in the pentameter. His restrictions are, rarely to allow elision, especially in the second part; not to admit words of one or three syllables at the conclusion of it; and of dissyllables, to make use only of verbs, substantives and the possessive adjectives. Very occasionally he ends with a quadrisyllable, but in twelve succeeding couplets of Catullus's *Coma Berenices* only one pentameter ends

in a two-syllable word; the others are *temporibus*, *obitus*, *pollicita es*, and the like.

Of the metres used in epigrammatic writing besides the elegiac couplet, the most noteworthy are the hendecasyllabic and the schazon, or limping iambic. The former consists of five feet, of which the first is a spondee, or sometimes an iambus, the second a dactyl, the third and fourth trochees, and the last a spondee.

Quæris | quot mihi | basi | ati | ones
Tuæ | Lesbia | sint sa | tis su | perque.

There is no *cæsura* in the line at all, and, as in all other verse, the quantity of the last syllable is of no account. The iambic schazon contains six feet, and is, in all respects, the same as the ordinary iambic of the Greek drama, except that the last foot is a spondee, which, by bringing two accented syllables together, produces the curious halting effect which gives the verse its name. The following line of Catullus will serve as an example:

O fûnde nôster, sêu Sabine sêu Tiburs.

The most frequent in use of lyric meters are the Sapphic and Alcaic stanzas and various combinations of choriambi (— — —), with a spondee at the beginning and an iambus at the end.

The Sapphic consists of three lines of five feet, of which the third is a dactyl, the second a spondee in Horace, but sometimes a trochee in Catullus, as also in the Greek of Sappho, and the rest trochees. Added to these is a short line of a dactyl and spondee. The Roman poets are more strict about *cæsura* than the Lesbian poetess, and the omission of it gives a very different rhythm. Horace, in most cases, puts it after the fifth syllable, but both he and Catullus occasionally use it after the sixth. The variety thus produced will be seen by comparing the first two lines of *Hor.* i, 10:

Mercu | ri, fa | cunde || ne | pos At | lantis
Qui fe | ros cul | tus || homi | num re | centum.

The Alcaic stanza consists of four lines; the first two are alike, of eleven syllables, with *cæsura* after the fifth. The rhythm rises in the first half with a spondee, an iambus and a syllable over, and falls in the second half with a dactyl, a trochee and a syllable over. The third line begins with a monosyllabic base, sometimes called *anacrusis* (backing water), and contains a trochee and spondee twice repeated. The third line has two dactyls, followed by two trochees. These last two lines have no *cæsura*, but Horace is very fond of beginning and ending the third line with a trisyllable.

Cûr mē | quērē | lis || exāni | mas tuis?
Nec dis | āmi | cum est || nec mihi | te prius
O | birē | Maece | nas, mē | arum,
Grandē dē | cus cōlū | mēnque | rerum.

Horace seems to have made up this stanza from Greek lyrics written in a mixed Lydian and Dorian rhythm. The first lines, with the two accented syllables in juxtaposition, are Lydian, while the Dorian predominates in the latter; indeed, if the *que* in the last line were omitted, the rhythm would be entirely Dorian,—i.e., running on like a military march.

There are some sixteen different combinations of metre used by Horace, besides his hexameters (which are, according to his own showing, only prose arranged in feet), and of these nine only occur once. The Epodes, his real satires, are mainly in iambic lines of 6 and 4 feet, alternately. An instance of a metre nowhere else used in Latin is *Od.* i. 18, where the feet are *Ionic a minore* (— — —), and the measure continues for forty such feet without any break. The Attys of Catullus is another unique poem, from a metrical point of view. It is called galliambic, from the Gaulish priests of Cybele, who are the subject of it, and from the iambic character of the verse. It reads somewhat irregularly, but with a wonderful vigor. The normal line consists of an anapæst, two iambs and a long syllable, after which the *caesura* comes,—so far it resembles the Anacreontic line,—then another anapæst, one resolved anapæst of four short syllables, and another syllable over, giving the lines what is called a catalectic rhythm.

Ēgō vī | tam āgām | sūb ā | lūis || Phrygiā | cōlūmīnī | bus
Ūbī cer | vā sīl | vī-cul | trīx | ūbī āper | nēmōrē vāgūs?

E. W. HUNTINGFORD.

PROTAGON. See CHEMISTRY, Vol. V, p. 579.

PROTANDRY, a botanical term applied to those cases in which the anthers of a flower mature, as shown by shedding pollen, before the stigma is mature, that is, has become receptive. In such a case, the pollen, to be effective, must be transported to the stigma of some older flower, the agent of transfer being usually an insect. See POLLINATION, in these Supplements.

PROTECTION, a method of governmental economic intervention that turns traffic and capital into channels through which they would not flow if left to themselves. The object of this intervention is to induce citizens of the nation practicing it, to put money and energy into home productions rather than to purchase abroad the commodities it desires to consume, provided they can be made at home. There are many forms of protection followed by different nations. Those most common to civilized countries are copyright and patent laws, which are enacted for the encouragement of literature and invention by creating a monopoly of the articles thus safeguarded for a fixed period. Subsidies are a form of direct protection, of which familiar examples are the bounties paid by European continental states for the production of sugar, or as were provided for Louisiana planters of the cane, under the McKinley tariff. Subsidies are not uncommon for the promotion of steam navigation. Great Britain aids in the building of mercantile steamships under specifications from the admiralty, with provisions that in time of war such vessels may be purchased by the government for transports or for reconstruction as cruisers. Again, long contracts are made for carrying the mails by vessels sailing under the flag of a particular country and at rates much greater than would prevail in the competitions of the open market for the same service.

But the usual conception of protection is, that it consists in customs-duties so laid as to lessen the

competition between home and foreign products. It is in this sense that France, Germany, Italy, the United States, Canada and most commercial countries are said to pursue a protective policy. Now most trading nations rely upon customs-duties for a very considerable part of their revenues. The United Kingdom derives nearly one fourth of its income, exclusive of its postal and telegraph service, from tariff duties. Belgium, which is a thoroughly free-trade state, relies upon these imports for about one fourteenth of its income. France, which is an example of a protective state, obtains one seventh of its income from customs. In the United States of America there has grown up a practice of leaving all sources of direct taxation, except imposts on liquors and tobacco, to the several states, and the general government, by the constitution, has control of all duties upon foreign traffic. Until the Civil War, for many years that government sought no other source of income, and even now a direct tax assessed by such authority meets with aversion from taxpayers. Thus, they were able to overthrow the income tax of 1894 in the supreme court on the ground of its unconstitutionality, the opinion of the court being in such terms as practically to deprive Congress of the power to levy a direct tax on real estate or personal property. (See INCOME TAX, in these Supplements.)

Clearly, therefore, the government is driven to rely for a revenue upon its tariff schedule and its internal tax on spirits and tobacco. In times of active foreign trade the first source of income provides the government with about 60 per cent of its income. In the year of financial depression, 1894, this source of income fell to 44 per cent, but for the five years ending with 1895, it provided almost exactly half of the total revenues of the government.

Still, it will not be fair to say that this peculiar position of the government forces it to a protective line of policy. The difference between protection and free trade depends on the incidence of the tax. The free trader would put the impost of customs on as few foreign products as possible, and then on those that cannot be raised at home and are in the nature of luxuries. Thus, the United Kingdom levies its impost duties on tobacco, tea and alcoholic products, the two latter producing roundly as much as tobacco, and that is an annual average of about fifty million dollars. The advocate of free trade will not tax food supplies, nor the raw or unfinished material of manufacture, and he exposes all home industries to foreign competition, on the ground that each people should perform for the world that service which they can do best, that is, most economically. He also claims that a duty thus levied falls only upon the consumer of the taxed product; that it can be simply and readily calculated in its effect upon the budget, since the amount of the commodity which will be consumed inside the customs line is known, whereas a protective duty, by raising the price of any line of merchandise, puts an incalculable sum into the hands of private dealers, while the government gets but the small moiety paid on actual importations.

On the other hand, the protectionist distinctly

wishes the tariff duty to fall upon foreign goods which come into competition with products which either are or can be supplied by home industry. He would have the incidence of the tax upon raw material as well as upon merchandise in any stage of manufacture. He would put it upon wool to protect the farmer, and correspondingly upon worsteds and woolen fabrics to protect the manufacturer; upon potatoes for the sake of the truck-gardener and upon starch for the factory-owner's profit. He prefers the impost to fall upon competitive commodities, though he would, for the sake of revenue, allow it to fall upon the tea, coffee, tobacco or sugar which might be brought into a land not semi-tropical or tropical.

Another distinction between the two systems is that the free-trader prefers an *ad valorem* impost, and the protectionist advocates a specific duty, or both. An *ad valorem* duty falls in amount as the prices of the commodity on which it is laid go down. Just when the home producer has the hardest time to keep his enterprise afloat, that is, when prices are lowest, he is least protected by an *ad valorem* duty. But a specific duty is of lessening ratio as prices advance. Moreover, it takes away from the importer the temptation to resort to fraudulent invoices. No matter what a commodity is billed at, the specific duty remains the same.

Again, the protectionist knows that the tenor of his principles is to lessen importations, and therefore, to reduce the revenues of the government. Extreme men go so far as to say a true protective duty should be prohibitory; that as soon as the tariff duty is sufficiently high to keep out of the home market foreign competitive goods, it makes no difference how much greater it is made. If a 25-per-cent duty would keep out Sheffield steel or Manchester muslins from New York, a 500-per-cent duty would do neither more nor less. If asked how the prices of any home-made commodity are to be kept down to a reasonably remunerative profit to the producer, he will answer that home competition must bring prices to that level. So long as the manufacture or production of a line of goods is exorbitantly lucrative, capital will flow in that direction until the investment has sunk to a reasonable profit, and then the temptation to invest will cease. But these views are extreme, and in actual practice have few advocates.

There have been various methods employed to determine what customs-rates are expedient. In the United States those who are called "free-traders," and whose views approach as near that ideal as the fiscal system of the government will permit, express their position as in favor of a "tariff for revenue only." Others demand an adjustment that shall be for "revenue with incidental protection";—that is, they prefer that a reasonable tax shall fall upon competitive foreign goods. With them a reasonable duty is one that will tempt to investment, but shall stop at a point where the importer can meet very lucrative profits with his taxed competition. Still others, a few, as has been already intimated, wish to stop wholly the importation of what can be produced at home. Within these limits there is a

variety of views, but any protective scheme must be in its nature tentative, and rest upon expediency. It is not susceptible of theoretical treatment.

Various suggestions have been made for the appointment of a commission on tariff duties which should study questions of labor, competition and profits, and report to Congress from time to time schedules of duties that are, in its judgment, necessary for the encouragement of home industries. But the proposal has met with little favor, because political leaders have been unwilling to let so agitating and potent a means of arousing the passion of self-interest escape from their control.

No commercial country of the world has suffered more from attacks on its fiscal system and from violent changes in it than the United States. In colonial times the people had no control whatever over their foreign trade. They were restricted by navigation laws of an arbitrary sort and by vexatious duties, for at that time Parliament had no mind to allow the American colonists even to supply their own wants, much less to enjoy trade with the West Indies and European states. The Revolutionary War had the effect of a protective system for two reasons: first, hostilities put an end to British trade to a large extent; secondly, the money of the colonies was so depreciated that imported goods could not be paid for, except at heavy premiums for exchange. A like condition of things arose in the war of 1812-15, and again at the opening of the Civil War. The necessity for new taxes, the risks and insurances attending importation, deranged exchange with gold at a premium, combined to start innumerable industries for which the government itself made a vast market. Out of the recollection of these circumstances has arisen a small school of protectionists who favor a depreciated currency, as the free coinage of silver, because it would lead to invoices adjusted to the inferior money, and consequently to *ad valorem* duties proportionately enhanced.

Aside from these immediate war effects, which invariably gave the country new industrial impulses, under its constitution the United States changed its tariff system eleven times in 107 years, in which there were some 32 years of "tariff for revenue," and the rest under the protective system, unless the Wilson law of 1894, which, except in a few partisan particulars, corresponds very fairly to the tariff of 1883, be considered in the former class. The longest period under one policy is that from the Civil War to the election of Mr. McKinley to the Presidency, a period of 35 years, during which the wealth of the country increased in a ratio unexampled in statistical history. If this period ended in depression and silent mills, there was reason enough for it from changes in the currency, made or threatened, and from the alteration of the tariff in 1894. In respect to alterations of the tariff, a change to higher protection has this advantage: it causes rising markets, while every recession from protection makes declining prices. The suspense attending such an impending change, the uncertainty that long debate throws over business engagements, quite adequately accounts for business anxiety and depression, without recurring to the effects of a customs-law not

long enough in operation to exhibit permanent effects.

A protective adjustment of duties is far from being a simple scheme, even when it is very desirable. The question arises at once as to how far protection should be granted. If a country be new, without industrial plants, and without skilled labor, it is well-nigh impossible for it to compete with old countries having large investments in factories, wide business correspondence, high credit and low rates of interest, abundant means of communication, and control of extensive and remunerative markets. These are the advantages that accrue from priority in the field. Here is a condition of things that brought from John Stuart Mill his concessions in favor of protection. His language is: "It cannot be expected that individuals should at their own risk, or rather to their certain loss, introduce a new manufacture and bear the burthen of carrying it on, until the producers have been educated up to the level of those with whom the processes have become traditional. A protecting duty, continued for a reasonable time, will sometimes be the least inconvenient mode in which a country can tax itself for the support of such an experiment."

Before there can be any production worthy of taking into consideration, there must be a producing plant. Even for the farmer, his land, his tools, his barns, his fertilizers and his season's labors involve an investment necessarily prior to a harvest. They are to him what a mill is to the flour-manufacturer, or the factory to the weaver. As industrial life grows more complex, manufactures require a large aggregation of capital. The money invested in such enterprises is wasted for all purposes except those of specific production. A new invention, or the improvement of an old one, has often put a farmer, as well as a manufacturer, out of the competitive race, and turned a once valuable property to waste. So a change in methods of transportation, in rates of freight, or even in fashion, will make a particular industry unremunerative. The life of even the best and most modern machinery, too, is short. The waste of capital in establishing and maintaining an industrial plant is something enormous. Time is also necessary, after it is shown that a commodity can be produced cheaply enough to warrant investment, to find a market. Confronting these hard conditions, the pioneer manufacturer of a country may well be apprehensive if he finds that large concerns abroad, with unlimited credit, are bent on his ruin, even at their own temporary loss. Thus John Brougham, at the close of the war of 1812-15, when new industries were nascent in the United States, advised his constituents to glut the American market with goods sold at a loss, in order "to stifle in their cradle these rising manufactures." Under the tariff of 1846 this happened again, and American iron-furnaces went out of blast and rolling-mills were closed because imported English iron was sold at \$40 a ton, when the American protected production had been at \$60. The industry in the United States was crushed and the old plants were never operated again. Then imported iron rose to \$80 a ton.

Another scheme for finding a basis for protective duties is to determine the rate necessary to maintain the superiority of wages in one country over that of another. But this is a complicated method, for, as Professor Richard T. Ely has shown, low wages do not go with cheap production. The better paid workmen have more enterprise, more dexterous adaptations, more invention, and so they demonstrate in the competitive markets of the world that they are worth their wages. Thus Thomas Brassey, when engaged on his French contracts for railway construction, took with him a band of English navvies to whom he paid one dollar a day, while to his French workmen he gave but half that sum, and he thought this well worth his while. In due time his Frenchmen clamored to be put on the same basis of pay as the navvies, and their demand was conceded. The result was economically favorable, for with advanced wages the Frenchmen did correspondingly more and better work. Again, Mr. E. Dubied, a Swiss manufacturer who had visited the Centennial Exposition in Philadelphia (1876), and had investigated the industries of the United States, advised his countrymen: "At this rate there is no reason why all our industries should not be overwhelmed, one after another, by those of America; and yet, when we ask what wages are paid the workmen in the latter country, we learn with surprise that they are three times as much as our workmen, both artisans and farm hands, receive." This result he attributed to the greater variety and excellence of American machinery.

Three causes, however, operate to break down the superiority of highly-paid skilled work. The most important of these is the ever-increasing subdivision of labor, by which the demand for skilled artisans is lessened. Fewer of them are needed in a great modern factory or machine-shop, where the duty of each operative is reduced to a single function. This brings on monotony of toil that is destructive of personal enterprise and ambition in the workman. Another cause is the production of commodities such as Charles Kingsley called "cheap and nasty." In sharp international competition, cheap men produce deteriorated fabrics and adulterated goods, and the market is flooded with them, to the exclusion of better wares from general use. (See *ADULTERATION*, Vol. I, pp. 167-177). Thirdly, immigration has had much to do with depressing labor in the United States. In this respect labor, like capital, tends to seek the most remunerative places and functions until its condition is equalized over competing nations. There is but little doubt but that the superior state of the American workman has acted upon the imagination of European wage-earners, drawing them to Western shores and raising the standard of living abroad. But this has been accompanied by a decline in the circumstances of the American wage-earner. It is evident that under free-competition the tendency of labor conditions of the great commercial nations is toward an equality of standards of life. To arrest this process the United States have forbidden the importation of Chinese coolies and the immigration of contract labor and paupers from Europe; and this

is as surely part of a protective system as imposts on foreign commodities produced by cheap labor. There are few things upon which there is greater unanimity of sentiment in the United States than the determination to maintain the superiority of its workmen, both in the difference of their wages from those of Europe and in their degree of comfort. The protectionist asserts that this is most efficiently done by making tariff-rates correspond with the difference of wages.

It has been widely supposed that the agricultural interest receives the least benefit from a protective system, if it does not suffer distinct detriment. To this, answer is made as follows: Under free-trade Great Britain has sacrificed her farming to her manufacturing and trading predilections. In no civilized country is agriculture more depressed or does land go out more from under the plow than in the United Kingdom. Even her pasture area shrinks. Again, the farmer is deeply interested in having an ample market as near his barns as possible. This is to be obtained by diversifying the industries of the country and making them as large as practicable. The more men there are in the shops and factories of the land, the greater will be the demands for the fruits of husbandry. There is a balance to be maintained between the enterprises of a nation. A large sheep-raiser of New Mexico argued that a duty of $7\frac{1}{2}$ per cent on imported wools would soon result in having 100,000,000 sheep in the herds of America. Each sheep requires 5 bushels of corn a year for its maintenance. This industry, therefore, when raised to the condition described, would make a home market for 500,000,000 bushels of corn, or for more than the entire surplus of the country. It is no advantage to the farmer to send his breadstuffs and provisions across the continent and the sea to compete in Liverpool with the wheat of Odessa and India. The transportation charges will be borne by his products. It is far better that the factory town should be near him to consume his surplus. If men are driven from the shops and mills they must go upon the land for a livelihood. This would increase the surplus of agriculture and lower its market price, making farming still less profitable. With this decline would come a lower grade of husbandry and the drift would be toward more hopeless and shiftless deterioration. To no class of the community is the home market more desirable than to the farmer, and it is protection that must create and maintain that market.

It was one of Henry C. Carey's arguments for the home market, that the exportation of farm products was constantly taking fertilizing material from the soil, where it is needed, away to foreign cities where it is not needed, and becomes a nuisance for the pollution of water-courses. This fertilizing material can only be replaced at considerable cost by the transportation of phosphates, nitrates and guano from the isles of the seas or the deserts of Peru. Human ingenuity has not been able to create, but only to discover, potash salts and phosphates. When once taken from the land they must be replaced or the ground will grow sterile. Is it not better for the wealth of a country and the profit

of the farmer, that this exploitation of the fertility of land should cease—that his products should be consumed near his fields, so that he can again return to the soil speedily the manures he has taken from it? Is it sound policy to impoverish one land that another may devote itself to manufacture?

Much is said of the injury to the consumer through the artificial rise of prices caused by a protective tariff. But the consumer is also a producer, and it is what he earns in that capacity that enables him to be a consumer at all. It were folly to offer him cheap bread, shelter and clothing, if he is deprived of the means to pay the pittance asked for them. In truth, the most prosperous times of a country are when wages are high and prices good.

Finally, the industrial independence of a country is necessary to its self-defense. A nation can feed its armies from its farm products, but it cannot equip or transport them so. Only countries having diverse and well-established manufactures can maintain a modern navy. It takes a farmer a whole year to turn his capital once, from harvest to harvest; the manufacturer's capital is going and returning incessantly. Hence a manufacturing country will bear a heavier rate of taxation and can meet an emergency more readily than an agricultural one. The nation that is sufficiently developed to supply all its own needs is in a posture to command peace or to repel hostilities as soon as they arise. If it be a protective policy that gives to it industrial independence, then it is a dictate of self-preservation to pursue protection. See FREE-TRADE, Vol. IX, pp. 752-762; and TARIFFS, in these Supplements.

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PROTEIDS. See CHEMISTRY, Vol. V, p. 579.

PROTEROGLYPHA, a suborder of serpents, including those with poison-fangs always erected. The group is opposed to *Solenoglyphæ* (q.v., in these Supplements). The cobra-de-capello (*Naja*), the sea-snakes (*Hydrophidæ*) and their relatives constitute the group. Some of the most venomous of reptiles are included.

PROTEST. See BILL, Vol. III, p. 673.

PROTESTANT EPISCOPAL CHURCH, IN THE UNITED STATES OF AMERICA, the legal title of that offshoot of the Church of England that was organized in the United States after the achievement of their independence. The expression *Protestant Episcopal* came into vogue in Maryland during the Revolutionary War. At that time the title *Church of England*, which this religious body had borne during colonial times, if it had not become a misnomer, was prejudicial in the minds of a nation striving to throw off the British yoke. The name that came into use indicates that this church is protestant toward the Church of Rome, and episcopal among Protestants. In 1789 a general convention of all the dioceses fixed this title, and it has remained unchanged, notwithstanding repeated proposals by Ritualists and High Churchmen to take a name of vaster comprehension.

COLONIAL PERIOD. The first charter of Virginia (1606) established the Church of England in that province, and in Newport's company came Rev.

Robert Hunt, who first preached in the United States at Jamestown, 21st of June, 1607, under an awning of canvas. He built a tiny church there, and served in it until his early death. In 1619 Governor Yardley organized the first legislative assembly of Virginia, and it declared the Church of England to be the church of Virginia and made provision for annual stipends to be paid for the support of four clergymen. In 1634 jurisdiction over the whole Anglican Church in the colonies was conferred on the bishop of London, and this was the disciplinary organization of the colonial church for 150 years. During all that time no prelate of that title put foot on American soil, nor was provision made for the creation of a colonial episcopate. The bishop of London ruled by commissaries sent to America, of whom James Blair was the most conspicuous. He was commissary from 1689 to 1743, and had jurisdiction over Maryland and Virginia. Under such a system ordained ministers were only to be obtained either by their importation from Great Britain, or by sending devout men to England for orders at the cost of a long voyage out and back and a considerable sum of money. There was no machinery of ecclesiastical discipline in the colonial church, and this state of things led to important consequences of a dogmatic sort many years afterward.

In New England the development was on quite other lines. The Plymouth Pilgrims were separatists, and did not build the institutions of Massachusetts. They were influential only by the large toleration and sweetness of their example. The Puritans of Massachusetts Bay Colony were men of another mold. At the time of the Endicott settlement in Salem, in 1628, the Puritans of England were not contending for liberty of worship, but for the reformation of the Church of England after the pattern of the church in Geneva. They wished to adhere to the establishment, but to eliminate from it prelacy and vain ceremonies. In America they considered themselves members of the mother-church, only their pattern of it was a purified one. Hence the Endicott immigrants, finding among them two brothers who were sticklers for the use of the *Book of Common Prayer*, sent them home in the ship that brought them, because they promoted sedition. So strong was the hostility to prelacy that the first Episcopal church proceeding from voluntary selection in Boston was not founded until 1723, and then this event came about through an influence originating in Connecticut. However, under the arbitrary command of Sir Edmund Andros, the *Prayer-Book* was forced upon the Old South Meeting-House in 1686, and three years later King's Chapel was built with English contributions, and remained an Episcopal congregation until James Freeman, in 1787, succeeded in carrying it over to the Unitarians.

In 1707 an Anglican parish gained footing in Stratford, Connecticut, and in 1722 Timothy Cutler, rector of Yale College, joined it at the cost of his connection with the college. He then went with Samuel Johnson and two others to England to obtain priest's orders. He and Johnson returned the next year—Cutler, to become rector and founder of Christ Church, Boston; and the latter, to become,

in 1754, the first president of King's (Columbia) College, in New York.

In 1696 Trinity Church was built in New York, and Mr. Vesey, who went to London for orders, was for fifty years its first rector. The endowment given to it by Queen Anne, and its farm extending from the church along the Hudson River to Christopher Street, in old Greenwich, have made it the richest single religious corporation in the United States. This parish was organized under an act of the previous year for the maintenance of Episcopal priests, and in the same year Christ Church, Philadelphia, was founded, the first parish of this denomination in Pennsylvania.

In the Carolinas the famous constitution drawn up by John Locke provided for the establishment there of the English Church, though the philosopher did not approve of the clause having that purport, for these colonies were full of dissenters. Thirty-five years later, in 1704, the churchmen of South Carolina obtained a bare majority in the provincial assembly and proceeded to disfranchise dissenters and to order the maintenance of Episcopal churches out of the public revenue—an example followed by North Carolina the next year.

The colonial church had its greatest support in the Society for the Propagation of the Gospel in Foreign Parts, organized in 1701, in London, at the solicitation of Commissaries Blair and Bray. Perhaps its best service was that of putting into the hands of the Bishop of London the means of disciplining the dissolute of his American clergy, for if he could not bring them to ecclesiastical trial he could cut off any support drawn from the society. The influence of this propaganda was seen in the increased number of ordained men sent to the colonies and their greater respectability for learning and character.

At the opening of the Revolutionary War a peculiar church polity had become firmly established. It was that of lay control of temporalities in the colonies. Thus it was not in the power of any spiritual authority to force a minister upon an unwilling parish. So, too, when later on the church came to organize on an independent basis, the laity were recognized as a fundamental factor in government. The causes of this in the South lay in establishing the church. When glebes were granted by law in 1619 to four parishes in Virginia, the administration of the property was put in the hands of vestries. Moneys paid out of taxes were intrusted to vestries in Virginia and the Carolinas. When Trinity Church was organized in New York the arrogant governor, Fletcher, demanded of the legislature the right to appoint or remove its minister, but the legislature denied it to him and gave the right of presentation to the vestry and wardens, and even authorized Episcopal parishes to settle rectors over them who were not in Episcopal orders. In 1748 the legislature of Virginia settled a long series of litigations on the part of clergymen to recover tithes and stipends by finally conferring on vestries the patronage of their respective livings, and it was this act which put an end to promising negotiations of the Bishop of London with the government to

give America an episcopate. The government declined because these vestries intercepted the prerogatives of the crown. Now these colonial vestries were the rate-payers of the parish, as was then the custom of England. Subsequently to the Revolution, in most dioceses the corporate body was made to consist of the wardens and vestry; in some the rector is added, so that without him the vestry cannot transact business when the living has such an incumbent. In some dioceses the rector has no seat with the vestry at all. In others, business may be done in his absence. In no diocese is the rector a corporation sole with a life interest in the temporalities, as is the case in England. This recognition of the lay element is a great departure from the practice of the mother-church, in her convocations.

At the close of the Revolutionary War there were about eighty parochial clergymen in the United States, those not at the head of the few strong city parishes being the missionaries of the Society for the Propagation of the Gospel. From them the society withdrew its stipends. There were also a considerable number of ordained men, who, in those unsettled times, had fallen into evil ways, and had ceased to officiate, and there was no one to call them to account. During the war many Episcopal ministers retired or fled from the country. Suspicion of their patriotism attached to them, because taking orders in England involved subscriptions of loyalty to the church of that country at a time when non-conformists were being proscribed by law and the court was jealous of its prerogative. To most colonists an Episcopal minister represented a foreign church. The disputes of the Colonies with Parliament and the Crown enhanced this distrust, although some of the most conspicuous of the parochial clergy were outspoken patriots. As a consequence of these things, when the war-clouds rolled away, this church was depressed with poverty, unpopularity and disorder.

OBTAINING THE EPISCOPATE. There are some local traditions that John Talbot, of Burlington, New Jersey, and a Mr. Walton, of Philadelphia, obtained consecration of the nonjuring Scotch bishops early in the eighteenth century, but sound church historians do not give the tradition credit. If it were true, the men are not known to have exercised episcopal functions.

In 1783 ten clergymen of Connecticut met secretly at Woodbury and agreed to send one of their number to England to ask for the episcopate there, but with instructions to seek it in Scotland if denied in London. They chose Samuel Seabury, who had been a chaplain to a Tory regiment in New York and was for the rest of his life on the retired payroll of the British army. The statutory requirement that a man must take the oath of royal supremacy as a prerequisite to consecration in England barred his way to the English succession, and he turned northward. On Nov. 14, 1784, he received consecration from the Scotch bishops in the house of Bishop Skinner of Aberdeen. He returned and settled in New London, exercising his functions in Connecticut and Rhode Island. He participated in one consecration, that of Clagett of Maryland,

and there were then present the three bishops in the English line; yet he had a very marked influence on the development of the Protestant Episcopal Church. Stiff Anglicanism prevailed in Connecticut; the Middle and Southern clergymen were latitudinarian or evangelical.

At a gathering of a few clergymen in New Brunswick in 1784, plans were formed for the meeting of a convention in Philadelphia the next year. One of the first considerations was to settle upon the constituency to be represented there. There was a considerable number of men in orders whose habits were, at least, not to edification, and their number was likely to be increased by the arrival of others desirous of escaping the ordinary at home. Lists were made of the clergymen of character to be recognized outside of Seabury's diocese, and they were invited to attend, as well as a number of eminent laymen. The convention of 1785 represented seven Southern and Middle states, the presence of the laity then being a novel feature, and one not acceptable to Connecticut. One of the first steps taken was to organize standing committees for each state, to act as ecclesiastical authorities until bishops should be obtained. These committees were to make up clerical lists, certify to each clergyman his right to be recognized as a minister of this church, and all others who lacked this certificate were prohibited from officiating in any congregation of the church under penalty of being advertised as impostors. Thus arose a new feature of polity, the "standing committees" common to every diocese from that day. They comprise usually four laymen and four clergymen; are a council of advice to the bishop and the administrators of the diocese when the bishop is away or the office is vacant. They certify the testimonials of all candidates for ordination, and in the recesses of the general convention must confirm or reject every nominee for a diocesan episcopate before he can be consecrated. They also present a clergyman for trial.

The convention which instituted this unusual and excellent system also drew up a constitution establishing a general convention to meet triennially, and to be composed of equal numbers of clerical and lay delegates from each diocese, and of a house of bishops when the church should possess three prelates. The two houses were to concur in legislation, and the lay delegates had a veto on the clerical vote when votes were taken by orders. The convention also put forth the *Proposed Book of Common Prayer*, which, under the influence of the peace-loving, latitudinarian White, was in substance the English book relaxed in dogma favorably to dissenters and adjusted to new political conditions.

In 1787, Parliament having authorized it, William White and Samuel Provoost were consecrated on Feb. 4th, in Lambeth Chapel—the one, bishop for Pennsylvania, and the other, bishop for New York. Meanwhile, the American Church had given guarantees to the Archbishop of Canterbury that it neither desired to nor intended to "depart from the Church of England in any essential point of doctrine, discipline or worship, or further than local circumstances require." In 1790 James Madison

was consecrated at Lambeth for Virginia, and the Anglican line of succession was canonically established in America.

CONSTITUTION AND ORDER. In 1789 a second convention, properly the first general convention of the church, was held, and Bishop Seabury, with a delegation from New England, joined in it; yet the three bishops sat and voted with the deputies. The constitution, as finally framed, is substantially as above described. The general convention is the supreme legislative authority; the standards of faith (though little reverence is paid to the Thirty-nine Articles in practice) and the rule of worship are in the *Book of Common Prayer*, and these are regarded as unalterable as to their substance, though rubrics and minor ritual methods may be changed. A bishop can only be tried by his peers, and the process is intricate. Each diocese is constituted on the plan of the general convention, has entire control over the discipline of priests and deacons, and votes by orders. The subscription of the clergy to the formularies is relaxed, and the candidate for orders, instead of declaring his *ex animo* assent to them, after the English usage, is required to make the more negative promise of conformity to the doctrine and worship of the church.

The *Prayer-Book* as revised in 1789 was a return from the *Proposed Book* to the English model. To it Seabury succeeded in adding the invocation from the Scotch Communion office, giving a high eucharistic quality to it. It omits the so-called Athanasian creed, provides a form of family prayer, and later there were added a *Form for the Consecration of a Church or Chapel* (1799) and one for the *Institution of Ministers* (1804). A final revision of this book began in 1883, and was nine years in progress. It aimed only at liturgical enrichment and a greater flexibility of services. The changes had no doctrinal significance. This church puts forth its own hymnal, and it is one of the best collection of hymns extant for dignity and lyric force.

RECENT HISTORY. In trying to be a national rather than a dogmatic organization, the Church of England became comprehensive. Puritan and prelatist, Calvinist and Arminian at first fought in it fiercely; but it was in it, and each party asked, not for toleration, but domination, until the time of William III. Its breadth no bitterness of the schools has wholly obliterated, though the partisan leaders would at times, if they had their way, mar its fair catholicity. The great mass of Episcopalians cleave to a dogma, not clearly stated in the church's confessions, and only inferentially gathered from its rubrics and canons. It is that a tactual succession of bishops from apostolic times is vital to the being of a church, and only episcopally ordained men can administer valid sacraments. Only those who do not believe this dogma are made unwelcome to the hospitable embrace of this communion. By law, in the Church of England, a minister of a Protestant continental church may hold a living in that communion, if he can find a patron to collate him to it, but no Dissenting clergyman of the realm may do so. This seeming paradox grew out of the national character of the

church. It was friendly to national churches; it looked upon dissent at home as seditious. Not until 1868 did the Protestant Episcopal Church finally and definitely exclude from occasional ministrations in its congregations men not in episcopal orders. At that time a Mr. Hubbard had been brought to trial in Rhode Island for inviting a Baptist minister to pronounce the absolution in his parish church. The canon already mentioned, formed to exclude unworthy Episcopal clergymen from service in the church, had undergone some verbal re-arrangement and its primitive purpose no longer existed. It was alleged that Hubbard had violated it, but the court acquitted him on the ground that the canon did not contemplate such an act at all, or had no relation to the invited services of ministers of other denominations. At that time the General Convention was in session and the canon was reconstructed, so that its prohibition of ministrations of clergymen not in Episcopal orders should thereafter be undoubted. In 1867 Charles E. Cheney was tried in Illinois for having omitted to pronounce infants regenerated by the Holy Spirit in baptism, according to the formulary of the baptismal office, and suspended. Suspension ended in six months in deposition because he would not promise to conform. In 1891 Howard MacQueary was forced from the ministry in Ohio for calling in question the miraculous conception of Christ and the resurrection of the body. All these trials were in diocesan courts, from which there has thus far never been provided any appeal, except to the diocesan bishop. Hence it is quite possible that what is heresy in one diocese might be found orthodox in another. Were the church at all given to heretical prosecutions, the lack of an appellate court might be found to be of disintegrating consequence.

In 1819 the General Convention created a Domestic and Foreign Missionary Society. It was a compromise between the High and the Low churchmen of that day. The Low party had upbraided the piety of High churchmen as not sturdy enough to seek the conversion of the heathen, to which reply was made, "We wish first to take possession of the United States." By tacit arrangement, foreign missions were intrusted to the Evangelicals and domestic missions to the Anglicans. But domestic missions made dioceses and dioceses made the General Convention. The consequence was, that the Low-church party steadily declined until it may almost be said to have no organization save some inactive or small societies. In their place arose a Broad-church school to contend for the comprehensiveness of the church, and it is naturally antagonized by ritualists and evangelicals.

In 1835, stirred by the splendid generalization of Bishop Doane, that "the church is a missionary society and every baptized person is a member of it," the General Convention reorganized the Missionary Society. Every bishop is a member of its board, and the convention appoints upon it clerical and lay representatives for every diocese. It meets every three years and intercalates its sessions with those of the General Convention.

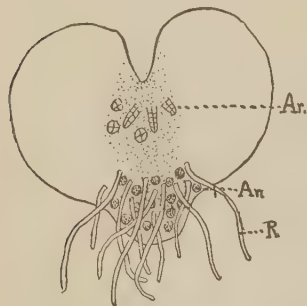
STATISTICS. The diocesan and missionary reports

to the triennial General Convention of 1894 resulted in the following statistics:

There were 52 dioceses and 18 domestic missionary jurisdictions. China, Africa, Japan and Haiti had missions with resident Episcopal supervision; Cuba, Greece and Mexico had missions under the supervision of an appointed diocesan bishop at home. At that time there were 78 active and 3 retired bishops; 4,323 priests and deacons; 4,870 organized parishes and missions; 580,507 communicants, and 400,566 Sunday-school scholars. The total contributions for the preceding year were over \$12,000,000; \$211,000 was raised for domestic and \$158,000 for foreign missions. There were 4 religious orders for men, 22 sisterhoods and 5 communities of deaconesses. The theological seminaries are: the General Theological Seminary in New York, under control of the General Convention, and of those not so controlled, one each in Middletown, Connecticut; Geneva, New York; Philadelphia, Pennsylvania; Cambridge, Massachusetts; Davenport, Iowa; Washington, District of Columbia; Nashotah, Wisconsin; Syracuse, New York; Faribault, Minnesota; Alexandria, Virginia, and Chicago, Illinois. There are eight colleges under denominational control: Griswold, at Davenport, Iowa; Hobart, at Geneva, New York; Kenyon, at Gambier, Ohio; Lehigh University, at South Bethlehem, Pennsylvania; Racine College, at Racine, Wisconsin; St. Stephen's, at Annandale, New York; Trinity, at Hartford, Connecticut; and the University of the South, at Sewanee, Tennessee.

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PROTHALLIUM, the name applied to the gametophyte of ferns and their allies (*Pteridophytes*).



PROTHALLIUM.

The ordinary leafy plant is the sporophyte, which produces spores upon its leaves, but bears no sex organs. When the spores germinate they produce a distinct plant, the prothallium (gametophyte), which bears the sex organs. The accompanying figure represents the prothallium of an *Aspidium*. It is a small, flat, green body, whose lower surface is shown in the figure. The female organs (archegonia) are represented at *Ar*, the male organs (antheridia) at *An*, and the roots (rhizoids) at *R*. See REPRODUCTION, Vol. XX, p. 430; and ALTERNATION OF GENERATIONS AND MORPHOLOGY, in these Supplements.

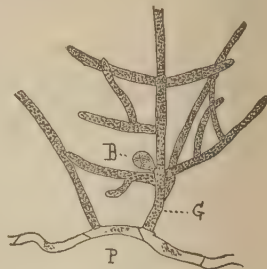
PROTISTA. See PROTOZOA, Vol. XIX, p. 832.

PROTOCOCCOIDEA. See VEGETABLE KINGDOM, Vol. XXIV, p. 126.

PROTOGYNY, a botanical term applied to those cases in which the stigmas of a flower mature, as shown by being ready to receive pollen before the anthers are mature, as shown by shedding pollen. In such a case the stigmas must receive pollen

brought from some older flower. See POLLINATION, in these Supplements.

PROTONEMA, a term applied to that alga-like branching structure in mosses, which develops directly from the spores, and upon which the leafy plants arise as lateral shoots. The accompanying figure represents the protonema of *Funaria*, which has developed from one of the spores shed from the capsule.



PROTONEMA.

The green (chlorophyll-containing) part is that which is shaded in the figure (*G*), while the colorless or brown part (*P*) was beneath the substratum and away from the light. At *B* is a bud which develops into the leafy axis known as the ordinary moss plant.

PROTOPHYTA. See PROTOZOA, Vol. XIX, p. 831.

PROTOPLASM, ANIMAL. See EMBRYOLOGY, in these Supplements.

PROTOPLASM, PLANT. See MORPHOLOGY, in these Supplements.

PROPTERUS. See LEPIDOSIREN, Vol. XIV, p. 468.

PROTOTHERIA. See MAMMALIA, Vol. XV, p. 371.

PROTRACHEATA. See MYRIAPODA, Vol. XVII, pp. 116, 117.

PROUT, FATHER. See MAHONY, FRANCIS, Vol. XV, p. 288.

PROVERBS. A proverb is an old and common saying, which contains some well-known truth or fact ascertained by experience or observation. It is generally short and pithy, with an undercurrent of wit. A saying, to be a proverb in the common acceptance of the term, must be in popular use, and must be of such sense and construction as to permit of its being used to express and illustrate more than a specific idea. If a saying, although brief and pithy, be only applicable to use in some one line of conversation, it is not, strictly speaking, a proverb. A proverb to be a proverb must be of such long and general use that it is marked with the stamp of approval and accepted by the people. A wise man's saying may be ever so wise, pithy and pointed, but it is only *his* saying, and nobody is bound to take it as a settlement of any question. In this respect proverbs and ballads are precisely on the same basis: they derive their authority from popular suffrage. But there is a difference between them, that the ballad had a maker, but no one man ever made a proverb. He may have made the original saying, but the forces that made the proverb were entirely beyond his control. Proverbs travel from family to community, from community to nation, and from nation to the world. A great number of modern proverbs are of Eastern origin—have come from the Arabic and Persian to the English. A proverb, it is said, gives its own origin from the sense conveyed by it and the method of the saying; it reflects the people with whom it originated.

Taking proverbs from a national standpoint, the Spaniards rank first; the number is prodigious. The Anglo-Saxon countries of continental Europe were rich in proverbs. The Norse had numerous proverbs. The literature of Iceland is an evidence of this. The Celtic and Gaelic, while numerous, were lacking in originality, many of them being borrowed from the Norse. The Teutonic group of nations had their proverbs in common, with provincialisms cropping in. Of the nations of the East, the Arabs hold first place, followed closely by the Persians, Hindustani and Turks. The Malay prose literature in popular use is composed almost entirely of proverbs. Collections of proverbs of every nation have been made, and are an interesting study. Arabic collections were made as early as the eleventh century, while in the nineteenth century the collecting has found votaries and made rapid progress in every country.

For collections of proverbs, English and foreign, see Bohn's *Handbook of Proverbs*; Bohn's *Polyglot of Foreign Proverbs*; Christy's *Proverbs and Phrases of all Nations*; Hazlitt's *English Proverbs and Proverbial Phrases*.

For the Biblical proverb, see BOOK OF PROVERBS, Vol. XIX, pp. 879 et seq.

PROVIDENCE, a city of Rhode Island. The predominant interest of Providence is no longer commerce but manufactures, the census of 1890 ranking it sixteenth among American cities in the value of its products; 1,934 industries reported. These had an aggregate capital of \$61,000,000, employed 42,000 hands and had annual products averaging \$77,000,000. Out of the total, the value of the cotton products was \$3,770,000, this being one of the chief cotton markets of the Northern states; the woolen and worsted goods, \$17,600,000; iron manufactured products (including steam-engines, boilers, locomotives, sewing-machines, rifles, screws, hinges, files, machinery, etc.), \$8,500,000. An extensive system of street-railways, comprising 45 miles of track, connects all portions of the city and suburbs with the center. The Providence Telephone Exchange, organized in 1879, controls over fifteen hundred miles of wire. The city is lighted both by gas and by electric light. It has also an extensive system of water-supply and sewerage. There are 15 newspapers, four being dailies. In the ratio of its valuation to its population, Providence ranks as one of the wealthiest of American cities. Brown University (q.v.) is located here. Population 1890, 134,146. See also PROVIDENCE, Vol. XIX, pp. 883, 884.

PROVINCETOWN, a town of Barnstable County, Massachusetts, at the northern end of Cape Cod, about 55 miles E. of Boston by water. It has an excellent harbor, having three marine railways and thirty wharves. It has hotels, and is very popular as a summer resort. It is an important center of the cod-fishing, whaling and mackerel-fishing industries, and also has shirt, oil and guano factories and ship and boat yards. Population 1890, 4,642; 1895, 4,555.

PROVO, a river of central Utah, rising on the slope of Bald Peak, in the Uinta Mountains, and flow-

ing west and south, emptying into Utah Lake at Provo City; length, about 150 miles. Its volume is sufficient to irrigate 100 square miles of land.

PROVO CITY, a city and the capital of Utah County, central Utah, on the Provo River, near Utah Lake, and on the Salt Lake and Los Angeles and the Union Pacific railroads, 40 miles S. of Salt Lake City. It is the trade-center of a rich farming region, which produces wheat, barley, grass, live-stock, etc., and an important manufacturing and shipping point for flour. Several tanneries and flour-mills are located here. Population 1890, 5,159; 1895, 5,992.

PROVOOST, SAMUEL, an American clergyman; the first Protestant Episcopal bishop of New York; born in New York City, Feb. 24, 1742. He studied in Columbia College and in Cambridge, England; was ordained in 1766, and at once became an assistant in the New York parish. From 1774 to 1784 he retired from the pulpit on account of his sympathies for the Colonies, and was active in urging patriotic measures. He became rector of Trinity Church in 1784; was elected bishop of New York in 1785, and was consecrated by the archbishop of Canterbury and York in London, in 1787; became chaplain of Congress in 1785, and of the Senate in 1789. He died in New York City, Sept. 6, 1815.

PRUDDEN, THEOPHILE MITCHELL, an American pathologist; born in Middlebury, Connecticut, July 7, 1849. After graduation at Yale he studied for a time at Berlin, Vienna and Heidelberg. In 1875-81 he was lecturer on histology at Yale Medical School; in 1881-92 director of the pathological laboratory of the New York College of Physicians and Surgeons, and in 1892 became professor of pathology there. His scientific writings are numerous. Among them are *Manual of Normal Histology* (1881); *Story of the Bacteria* (1889); and *Water and Ice* (1891).

PRUSSIA, KINGDOM OF. (For general article giving geographical, geological and historical descriptions, see PRUSSIA, Vol. XX, pp. 1-19.) In 1820 the income of the King of Prussia was fixed at \$1,930,824. Previous to that time the king enjoyed the entire income of the state domains. In 1859 an additional allowance was made, and again in 1868 and 1889, until in 1895 the king's total income was \$3,852,720, as far as it figured in the budget. But in addition, the reigning house controls many castles, forests, and estates from which a large revenue is derived. The area of Prussia is reported officially as 134,537 English square miles. The population in 1890 aggregated, in the 14 provinces, 29,955,281. The average density per square mile was 222.7. The area at the close of the reign of Friedrich I, King of Prussia, in 1713, was about 43,400 square miles; in 1797 the area was 118,030 square miles; from 1816 to 1858, 106,614; from 1858 to 1867, 108,514; in 1890, 134,537.

Of the total population in 1890, 45 per cent lived in towns. The population included 14,702,151 males and 15,253,130 females, or 103.7 females per 100 males.

AREA AND POPULATION BY PROVINCES.

PROVINCES.	AREA IN SQ. MILES.	POPULATION 1890.
East Prussia (Ost Preussen)-----	14,281	1,958,663
West Prussia (Westpreussen) ----	9,852	1,433,681
Berlin -----	25	1,578,794
Brandenburg -----	15,381	2,541,783
Pomerania (Pommern)-----	11,625	1,520,889
Posen -----	11,183	1,751,642
Silesia (Schlesien) -----	15,563	4,224,458
Saxony (Sachsen)-----	9,747	2,580,010
Schleswig-Holstein -----	7,299	1,217,437
Heligoland* -----	(0.23)	(2,086)
Hanover (Hannover)-----	14,855	2,278,361
Westphalia (Westfalen) -----	7,802	2,428,661
Hesse-Nassau -----	6,059	1,664,426
Rhine (Rheinland)-----	10,422	4,710,391
Hohenzollern -----	441	66,085
Total -----	134,537	29,955,281

POPULATION OF PRINCIPAL TOWNS JAN. 1, 1891.

TOWNS.	POPULATION.	TOWNS.	POPULATION.
Berlin (1890)-----	1,578,794	Aachen -----	103,470
Breslau -----	335,186	Halle-on-Saale --	101,401
Cologne (Köln)---	281,681	Dortmund -----	89,663
Magdeburg -----	202,234	Posen -----	69,627
Frankfort-on-the-		Essen -----	78,706
Main -----	179,985	Charlottenburg -	76,859
Königsberg -----	161,666	Kassel -----	72,477
Hanover -----	163,593	Erfurt -----	72,360
Altona -----	143,249	Görlitz -----	62,135
Düsseldorf -----	144,642	Wiesbaden -----	64,670
Danzig -----	120,338	Frankfort-on-the-	
Elberfeld -----	125,899	Oder -----	55,738
Barmen -----	116,144	Kiel -----	69,172
Stettin -----	116,228	Potsdam -----	54,125
Krefeld -----	105,376		

CONSTITUTION AND GOVERNMENT. The Constitution of Prussia has undergone many revisions. The last two were on Feb. 19, 1879, and May 27, 1888. The fundamental laws vest the executive and part of the legislative authority in the king, who attains his majority at the age of eighteen. The crown is hereditary in the male line, and in the order of primogeniture. In the exercise of the government the king is assisted by a council of ministers appointed by royal decree. The legislative authority the king shares with a representative assembly, the Landtag, composed of two chambers, the first called the "Herrenhaus," or House of Lords, and the second the "Abgeordnetenhaus," or Chamber of Deputies. The assent of the king and both chambers is requisite for all laws. Financial projects and estimates must first be submitted to the second chamber, and either accepted or rejected *en bloc* by the upper house. The right of proposing laws is vested in the government and in each of the chambers.

The upper chamber is now composed of, first, the princes of the royal family who are of age, including the scions of the formerly sovereign families of Hohenzollern-Hechingen and Hohenzollern-Sigmaringen; secondly, the chiefs of the mediatised princely houses, recognized by the Congress of Vienna, to the number of 16 in Prussia; thirdly, the heads of the territorial nobility formed

by the king, and numbering some fifty members; fourthly, a number of life peers, chosen by the king from among the rich land-owners, great manufacturers and "national celebrities"; fifthly, eight titled noblemen elected in the eight provinces of Prussia by the resident land-owners of all degrees; sixthly, the representatives of the universities, the heads of "chapters" and the burgomasters of towns with above fifty thousand inhabitants; and, seventhly, an unlimited number of members nominated by the king for life or for a more or less restricted period.

The second chamber consists of 432 members—352 for the old kingdom and 80 added in 1867 to represent the newly-annexed provinces; the proportion to the population in 1890 was 1 to every 69,181.

The King of Prussia and his chief ministers of state are the same as those of the German Empire (q. v., in these Supplements).

EDUCATION. Education continues to be compulsory in Prussia. Schools have local support with state aid. All parents must send their children to one of the elementary schools, in which all fees are now abolished. No compulsion exists in reference to a higher educational institution than elementary schools. The school age is from 6 to 14, and the number of that age in 1890 was 5,401,566. In the budget of 1890-91, the sum of \$20,723,870 was appropriated for instruction. Of this amount, \$19,657,047 was for ordinary instruction.

EMIGRATION. In 1892 the emigration from Prussia by German ports, Dutch ports and Antwerp reached a total of 76,196; in 1893, 53,471; and in 1894, 24,203.

FINANCE. The budget estimates for the year ending March 31, 1896, placed the revenues at \$474,868,375, and the total expenditure at the same amount.

The national debt of the kingdom, inclusive of the annexed provinces, was, according to the budget of 1895-96, \$1,588,466,579.

The charges for interest, amortization and management of the debt amounted to \$69,969,818 in the same financial year (1895-96).

The debt amounts to about \$51.55 per head of population, and the annual charge to about \$2.19 per head. In 1890 the total of incomes was estimated at \$2,500,000,000, and the average per head \$88. The income tax averages about sixty cents per head of population. Since April, 1895, only the income-tax and a new tax (Vermögenssteuer) are direct state taxes.

PRODUCTIONS IN 1893-94. Among the summaries of the reports were the following: Establishments for manufacturing beet-sugar, 316; which consumed 8,400,757 metric tons of beet-root, in the production of 1,001,804 tons of raw sugar. There were 6,284 breweries in operation, brewing a sufficient quantity of beer to supply 20 gallons yearly to every inhabitant of the kingdom.

The coal-mines reported an output in 1894 of 70,643,979 tons. Prussia yields about half of the world's annual production of zinc, copper and

* Heligoland has been attached to Schleswig-Holstein since 1891.

lead. The total value of the mining-products in 1894 was 576,679,725 marks.

PRYOR, ROGER ATKINSON, an American lawyer; born near Petersburg, Virginia, July 19, 1828; graduated at the University of Virginia in 1848; was admitted to the bar; on the staff of the *Washington Union* in 1852, and editor of the *Richmond Enquirer* in 1853; special commissioner to Greece in 1855; edited *The South* at Richmond (1856-67); Congressman in 1859; member of the Provisional Confederate Congress at Montgomery and of the first regular Confederate Congress at Richmond; entered the Confederate army as colonel, and was made brigadier-general after the battle of Williamsburg; taken prisoner in 1864, and was confined for four months in Fort Lafayette. In 1865 he began the practice of law in New York City, and was regarded as an able criminal lawyer; appointed judge of the court of common pleas in 1890; elected to same office in 1891; by the revised constitution of 1894, became justice of the supreme court in January, 1896.

PSYCHICAL RESEARCH, SOCIETY FOR. See TELEPATHY, in these Supplements.

PSYCHOLOGY is the study of the phenomena that arise within the domain of the human mind, or in other words, of the facts of consciousness. Inasmuch as the content of the mind is the sum of a man's knowledge, for what is not presented in consciousness does not exist for an individual, it is evident that the science of mind is an all-embracing one. It is true that psychology is not concerned with the contents of the mind, but only with the way in which the mind acquires and deals with them. Still, the relation of the mind to its entire world of facts is not only a very large field for investigation, but, in many particulars, an obscure and debatable one. Confusion is increased because, as yet, psychologists lack a precise terminology, such as makes other sciences exact. Again, the subject is implicated with other fundamental departments of thought, and it also breaks up into various branches, while it is approachable from many standpoints. All metaphysics, or speculative philosophy, takes its origin in the mind, and with it the grounds of religion are laid. There could be no metaphysic if there were no mind; there could be none were mind proved to be a physiological result, for then mind would be purely material and metaphysic would become identical with physics. Speculative philosophy begins with assumption of the Ego or subject. It develops through a determination of the constitution of the Ego or of mind, and of its intuitions and categories. Upon these, and the question whether volition is determined or free, depends the authority of religion and the validity of morals.

Now, it is possible to free psychology from all speculative considerations, and to restrict it simply to the study of facts as they arise in consciousness, without inquiry as to the nature of the mind, just as it is possible to classify plants without attention to vegetable physiology, or to study mechanics without inquiry into physics. It is

concerned with the *how*, and not the *why*. In point of fact, it is just this restricted research that constitutes the science of psychology to-day. Such is the presentation of this subject in the article on PSYCHOLOGY, in Vol. XX, pp. 37-85, of this ENCYCLOPEDIA. That article carefully marks the line which separates physiology from psychology. It belongs to the school of British thought, is especially influenced by the philosophy of the Realistic or Scotch Common-Sense reasoners, and owes but little to the German psychologists of the Wundt or physiological school. It is written rather on the lines of introspection, assuming the existence of the Ego as subject, taking the normal individual for its standpoint, laying a basis in its categories for intuition, and leaving the freedom of the will in a limited limbo. (See pp. 37, 39, 44, 72, 75, and 83.) This does not materially affect its results, for experimental psychology has not yet grown to an impeachment of them, and in them the pedagogist will find all the material commonly used in the scientific consideration of education. It may be classified as belonging to both the *empirical* and the *introspective* school, the first of which is defined as "the study of observed facts of consciousness and of their laws, without attempting to account for them by underlying principles," and the second as "based on introspection, or the observation of personal consciousness."

It will be clear, on reflection, that speculative philosophers, theologians, and orthodox moralists will hardly leave so fundamental a province as psychology without a theory and a method. From the days of Chilon, one of the "Seven Sages of Greece," his injunction, "Know thyself," has had a profound and fundamental relation to philosophic thought. For centuries psychology had its devotees, but they treated it as a part of metaphysic. When it began to be separated from speculation, and made a special branch of study, as in Locke's *Essay Concerning the Human Understanding*, it came to be known as "Mental Science." Under this title it passed into the curriculum of schools and colleges, and it was not until the middle of the nineteenth century that the term "psychology" came into English vogue, chiefly through the influence of the works of the Germans, Carus and Herbart. Until within recent years, mental science was more or less compromised with philosophy and ethics, and its exponents continued to seek the "underlying facts of consciousness, or to derive such facts *a priori* from the concept of the soul." This school has been called that of *rational psychology*, but its methods and postulates have become obsolete, although it did much to clear the way for those who came after.

For additional facts on this subject, see Hickok's *Empirical Psychology*; Porter's *Human Intellect*; McCosh's *Truths*; Spencer's *Education*; Bain's *Education as a Science*; Payne on *The Science and Art of Education*; Baldwin's *Handbook of Psychology*, and *Mental Development in the Child and the Race*; and Sully's *Teacher's Hand-Book of Psychology*.

PSYCHROMETER, an instrument for measuring the relative humidity of the air. (See *HYGROMETER*, Vol. XII, pp. 570, 571.) It consists of two thermometers, a wet bulb and a dry bulb. The *sling* or *whirled psychrometer* is moved swiftly through the air to insure more rapid evaporation.

PUBLIC LANDS OF THE UNITED STATES are lands which are owned by the government. The term, in its wide and general usage, has especial reference to such lands owned by the government as are open to sale, or any other method of disposal, to persons who will comply with stipulations of the law. In 1893 the total area of United States vacant lands was estimated at 568,000,000 acres, located in 25 states and territories. Much the largest part of these lands was west of the 100th meridian, and 542,000,000 acres (or 95 per cent) were in states and territories west of the Dakotas, Nebraska, Kansas and Texas. East of these states there were 26,000,000 acres, located partly in the swamps of Florida and Louisiana, and partly in Arkansas, Michigan, Wisconsin and Minnesota, in what have, in the past, been widely represented as non-agricultural regions. The exhaustion of the more attractive and desirable public prairie-lands has, however, turned attention toward the others, particularly in the three Northern states mentioned, and, upon investigation, the so-called pine-barren and alleged worthless lands are, in many cases, proving to be quite otherwise.

In 1890 there were 12,798,837 acres disposed of by the government. The figures dropped, in 1891, to 10,477,700 acres, and in 1892 again rose to 13,664,019 acres. Therefore, taking the annual average disposal at 12,000,000 acres, and supposing all the vacant land to be susceptible to entry, it would all be taken up in fifty years. As a matter of fact, however, only a small portion of the vast area can be acquired under the present laws, or is now suitable for homestead purposes. A great deal of it consists of high mountains, lava-covered plains or eroded plateaus, or is otherwise too rough. The portions which are now, perhaps, the choicest—in that they possess a rich and deep soil—are, for the most part, valueless at present because of aridity. It has been possible to redeem portions of these lands through irrigation; but the area within reach of a visible water-supply is small, and, at the present rate, will all be gone in a few years. Speculations as to the length of time before it will become exhausted have led the public attention to the questions bearing upon their reclamation; inasmuch as men are now, every year, more and more disposed to take lands which, a few years since, were regarded as undesirable. Therefore, the amount taken from year to year must now diminish, not because of a decreasing demand, but through an inadequate supply. The eleventh census shows that the area irrigated in 1889 was 3,631,381 acres, which area was located in scattered patches between the 100th meridian and the Pacific Coast. The total land-sur-

face in this area, which possesses almost every imaginable combination of soil and climate, is (deducting 36 counties in western Oregon and Washington) 883,312,000 acres, and the area irrigated is only four tenths of one per cent of the enormous territory. These lands may be divided into four classes; viz., desert lands, pasture-lands, timber-lands, and firewood-lands. 1. The desert lands are those areas where cattle are unable to obtain drink, and where the vegetation is so ephemeral as to be of little value for pasturage; the soil, however, is often rich, and when watered has given forth prolific crops. These "deserts," even in the natural state, are seldom entirely without vegetation, and often, during a brief portion of the year, are covered with a variety of verdure both surprising and beautiful. 2. The pasture-lands are the great plain and other regions (including the mountain valleys and parks) which are available for pasturage. 3. The timber-lands are the forest areas upon the mountains, where the trees are large enough for timber. 4. The firewood-lands are those which lie intermediate between the pasture-lands and the high slopes, which may be said to fringe the timber-lands, where the tree-growths are not large enough for timber use. It may be added, however, that there are scattered here and there within this area, called the firewood belt, certain strips and patches of land which are capable of productiveness without the aid of irrigation. The percentage of such lands cannot now be computed, and although not great as compared to the whole, still would amount to considerable in the aggregate. It will therefore be included in the firewood area. The divisions, therefore, are as follows:

	ACRES.
Desert land	64,000,000
Pasture-land	620,912,000
Timber-land	83,200,000
Firewood-land	115,200,000
Total	883,312,000

Of this total, less than 568,000,000 acres still belong to the general government. The irrigated and irrigable lands are mainly included within the division known as pasture-land; and, in a general way, it may be stated that nine tenths of this area is covered with a fertile, arable soil which only lacks moisture to render it highly productive. These figures are partially assumed, but are based upon good grounds and careful estimates; and if they are proven, then, out of, say, 616,000,000 acres of arable lands within this pasturage area, less than three fifths of one per cent were irrigated in the census year. The reclaimability of the balance is simply a question of water-supply, and the providing of an adequate supply of water some time in the future is by no means to be regarded as a wholly visionary or impractical dream. The vast areas of public lands in Alaska are scarcely within the possible range of computation, and are not included within the above estimates. For ways of acquiring public lands, see *HOMESTEAD*, Vol. XII, pp. 122-124; also,

under the *Timber-Culture* and *Desert-Land* laws, see UNITED STATES, in these Supplements.

PUBLIC SCHOOLS. See SCHOOL, PUBLIC, in these Supplements.

PUCCOON, a name applied to several plants of widely separated families: 1. Species of *Lithospermum*, a genus of *Boraginaceæ*, otherwise known as gromwells; 2. *Hydrastis Canadensis*, belonging to the family *Ranunculaceæ*, or crow-foots, and known as yellow puccoon; and 3. *Sanguinaria Canadensis*, a plant of the *Papaveraceæ*, or poppies, commonly known as blood-root. In all these cases the name has been given on account of the colored root-sap, which has been used more or less as a dye.

PUDDLING. See IRON, Vol. XIII, pp. 320-326.

PUEBLA, a state. See MEXICO, Vol. XVI, pp. 214-218.

PUEBLO, a city of southern Colorado, and one of the most prosperous between the Rocky Mountains and the Missouri River, the capital of Pueblo County, Colorado. It is located on the Arkansas River, 115 miles S. of Denver, 40 miles E. of Cañon City, and is reached from all directions by the Denver and Rio Grande, Denver and New Orleans, Atchison, Topeka and Santa Fé, Rock Island, and other leading transcontinental railway lines. As a manufacturing city, railroad center, and in some other respects, Pueblo is second in importance to no city in southern Colorado. It is the location of the Colorado Coal and Iron Company, Colorado Smelting Company, Colorado Pressed Brick Company, Colorado Bridge Company, and many other undertakings owned and controlled by home capital. These embrace foundries and machine-shops, enterprises devoted to the manufacture of wire fencing, cornices, brick, furniture, lumber, sashes, doors and blinds, carriages, buggies and wagons, agricultural implements, mining machinery, etc., representing heavy investments, and employing a large force of skilled artisans. It has three daily and several weekly papers, one private and two national banks, seven churches, a number of schools (graded and commercial), a large number of stores, eight hotels, two theaters, the State Agricultural Society and the State Asylum for the Insane. It is lighted by gas and electric lights, and a well-managed street-railway system affords the means of rapid transit throughout the city. Population 1890, 24,558; 1894, 30,000.

PUEBLO INDIANS or **PUEBLOS**, families of North American Indians, found, in the sixteenth century, by the Spanish explorers in Mexico, New Mexico and Arizona. They are included in four linguistic families, representing 28 tribal groups, living in as many villages. These Indians were originally small people, the men averaging not more than five feet in height. The men were lean, rather sharp-featured, dark or tawny, expression mild and intellectual. The women were fair olive. Their clothing was, for the most part, made of woven bark, yucca-fiber, cotton or cottonwood-down, fur and

feathers. The men wore robes of rabbit-skin or catskin, or mantles of cotton elaborately striped and embroidered, buckskin tights, or else leggings made of strips of buckskin wound around the leg like a bandage, and fastened at the knee with garters of colored cotton yarn. Sandals of yucca, sometimes moccasins of buckskin with rawhide soles, protected the feet. The warriors wore helmets made from the skin of the bear, puma, antelope or bison; their shields were of basket-ware or rawhide; their weapons were lances, javelins, bows, clubs, knives of flint or obsidian, stone axes, and swords whose edges were of some flinty material. The women wore a sleeveless dress of cotton reaching below the knee, a mantle of embroidered cotton, a head-shawl, leggings and sandals, or for the house knitted stockings. Their hair was parted in the middle, and tied in two knots back of the ears for the married ones, and in two coils over the ears for the unmarried.

Their houses were clustered into villages, in form either rounded or oblong squares. They were several stories in height, the highest being on the outer side, the others descending in terraces to central open courts and alleys. There were no doorways in the lower stories, access being gained to the roofs of the houses by means of ladders, which could be raised at any time for protection from enemies. The houses themselves were entered through scuttles in the roofs. The upper stories had both doors and windows. Each house was divided into rooms, all of which were very small. Each household occupied three or four of these rooms. There was always a kitchen, a storeroom, and an eating and living room. The village was divided into wards of the same number as the tribal divisions, and each ward into quarters equal in number to the clans of each division. The women and children lived in the quarters, the men in large, partly underground chambers, one for each division of the tribe. In these chambers they held their councils, and labored at their looms, or made their weapons of war. In them they also amused themselves, taught the young the usages and traditions of their respective divisions, and settled disputes between the clans.

The men were the weavers and spinners. They irrigated the land and raised the crops. The women cared for the household, cooked the food, made pottery, baskets and utensils for the house. They also had small gardens just outside the village, where leeks, peppers and fragrant herbs were raised. The supply of meat is obtained by the divisions joining in round-ups of game. Dams, ditches and embankments for irrigation, at a distance from the village, are also made by the divisions working together, so as to be able to resist the attacks of neighboring tribes.

The tribes were composed of clans, and the clans of families of kindred. Each clan was named after some animal, plant or other thing, which name was the "totem" of the clan. Clans whose totems were analogous were grouped together to

make a division. Thus the Sunclan and the Eagleclan were in the same group, as the sun and the eagle both dwelt in the sky. Each group had its priest, chief or "medicine-man," who was the keeper of the powers of the spirit of the animal or thing of the region which his division represented. These divisional priest-chiefs were from four to seven in number. There were, also, secret societies, or cults, or fraternities, of these priests, the members of which were the teachers and keepers of the traditions, rituals, religious regulations, magic mysteries and medicines or powers of the divisions to which they belonged. Disease was believed to be of ghostly origin, and these priest-doctors not only treated it, but labored to avert it by charms, rituals and offerings. The gods of the Pueblos were celestial gods, ancestral gods, phenomenal gods and animal gods, equally of both sexes. There was the supreme god, the god of the sun-shield, and under him the god of fate and his brother, the god of war, the god of time, of the seasons, and the god of dawn. The Master of Life was the Messiah of the Pueblos, the mediator between the mortal-like gods and the celestial. The natural world was the offspring of the spiritual world, and the hot springs of Colorado were the umbilical connection between these two worlds; accordingly, the offerings to the Master of Life were addressed by the priests of the cult societies at this place. Spiritual worship was largely hygienic. The priests abstained from meat four days each month, and for a number of days at the summer and winter solstices. Shells, coral, beads, etc., were sacrificed to the gods, and incantations and dances performed before altars which symbolized some sacramental region. Offerings of food and other articles were made in the autumn season, in remembrance of the dead, and in November of each year festivals and celebrations of creation were held.

A man and a woman of the same clan were not allowed to marry each other; lovers could not be betrothed without the consent of the priest-chief. Before betrothal, a man could display his preference for the woman of his choice only in a general way; after betrothal, the maternal relatives accepted the man as a perpetual guest of the clan, which placed divorce chiefly in the hands of the women. After the birth of a child, birth-offerings were made, and after nine days the child was presented to the sun, and the clan name given by the clanspeople of the mother, to whom it belonged ever after. Upon the death of a person, he was renounced by the clanspeople of the mother to the clanspeople of the father by breaking a jar of water beside the body. Presents were given; and if the dead had been a priest, he was buried and the presents were burned, if not a priest, the body was burned with the presents.

There is evidence for believing that the Pueblos once lived in regions to the north and east of the arid regions where they were found by the Spaniards. Their tribes were driven into the

deserts by stronger tribes. Cultivation by irrigation became a necessity, and fixed habitats followed as a consequence. They built their huts of wood and mud, then their houses of stone and mud, and grouped them around watering-places. Fixed in habitation, tilling the soil and acquiring food-stores, they attracted the attention of their enemies, who forced them to fly to the cañons and cliffs, where they became cliff and cave dwellers, and developed the terraced and cellular type of architecture, the building of their villages in one, known as a pueblo, the dividing it into quarters—the men from the women—so peculiar to these people at the time of the Spanish conquest. This same general plan is still followed in the modern pueblos.

The ruins of houses and villages, thousands in number, which indicate the presence and movements of these people, are found from central Nevada, Utah, Colorado and Texas, southward into Mexico. Many of them are buried under the sands, to be unearthed only by accident. By far the greater number of these ruins are found upon the banks of the San Juan River and its tributaries, and upon the mesas in this vicinity, the largest group being located in the upper part of Cañon de Chaco. It is estimated that at the time of the Spanish conquest these Indians numbered 30,000. The total population at the present time is about 10,000. The modern Pueblos are found in greatest number upon or near the banks of the Rio Grande del Norte. Zuñi is near the western border of New Mexico, while the seven Moqui villages are in the northeast corner of Arizona. See also *INDIANS*, Vol. XII, p. 827.

PUERPERAL FEVER, childbed fever, or technically, *Puerperal Septicæmia*, a continued fever occurring in connection with childbirth. It is an infectious disease, produced by the action of bacteria which destroy tissue or indirectly poison the patient by producing toxic substances which are absorbed. The septic matter may be communicated by the hands of the physician or nurses, or by sponges, napkins, etc. The presence of bacteria produces an inflammation, the results of which are found in the uterus, the tissues around it, the veins and lymphatics. The peritoneum is nearly always affected, and swelling, softening, or abscesses may be found in the uterus, ovaries, kidneys, spleen, liver, lungs, muscles, and other tissues. The disease may begin within three or four days after delivery, or later, with headache, occasionally with a chill. The pulse becomes feeble and rapid, 130 or more a minute; the temperature rises to 103° or higher. Vomiting may occur, and diarrhœa is often very persistent. The tongue is coated with a heavy fur, and a filthy crust forms on the lips and teeth. There is often acute pain, with tenderness and swelling of the abdomen. The mammæ are often hard and painful, and the secretion of milk is arrested. As the disease progresses, the breathing becomes short and hurried, pneumonia, pleurisy or jaundice may develop, and the joints may swell and suppurate. The disease generally runs a rapid course, ter-

minating fatally within a week. In the final stage a clammy sweat appears, with hiccough, twitching of the tendons of the wrist, and muttering delirium, the patient dying from exhaustion. The disease is of such a serious nature that its treatment should always be prescribed by a physician. But there are always indicated the application of antiseptic douches to the affected parts, nutritious food and stimulants to sustain life. See also *Septicæmia*, under PATHOLOGY, Vol. XVIII, p. 401.

PUERPERAL INSANITY. See INSANITY, Vol. XIII, p. 109.

PUERTO LAMAR. See COBIJA, Vol. VI, p. 89.

PUFF-ADDER. See VIPER, Vol. XXIV, p. 247.

PUFFBALLS, the common name of species of the *Gasteromycetes*, a group of saprophytic fungi with large and usually more or less globular spore-fruits. The spores are borne in cavities in the interior of the globular mass, and escape by the drying and rupturing of the surrounding tissues. The puffballs proper are species of *Lycoperdon*, some of which become very large, and all of which are more or less edible.

PUGATCHEFF, YEMELIAN. See RUSSIA, Vol. XXI, p. 99.

PUGET SOUND. See WASHINGTON, Vol. XXIV, p. 385.

PUGH, JAMES LAWRENCE, an American public man; born in Burke County, Georgia, Dec. 12, 1820. He received an academic education in Alabama and Georgia; was taken to Alabama when four years old, where he permanently resided; licensed to practice law in 1841 and was employed so when elected to the Senate. He was a Taylor elector in 1848, Buchanan elector in 1856 and state elector for Tilden in 1876; was elected to Congress without opposition in 1859; retired from Congress when Alabama seceded from the Union in 1861. He joined the Eufaula Rifles, in the First Alabama Regiment, as a private; was elected to the Confederate Congress in 1861 and re-elected in 1863; after the war, resumed the practice of the law; was member of the convention that framed the state constitution of 1875; elected to the Senate in 1880 and re-elected in 1884, and again in 1890.

PUGILISM, the art or practice of boxing or fighting with the fists, especially as practiced in the prize-ring. In its milder form, under the name of boxing, contests of this character are described under WRESTLING AND BOXING, Vol. XXIV, pp. 690, 691.

Prize-fighting with bare knuckles has, with the advance of civilization, become illegal in nearly every country, and remarkable in this respect has been the advance and reform of popular opinion in America. Just as in England in Georgian days a prince regent would patronize the prize-ring, so in America a professional pugilist was at one time regarded as a species of popular hero. But the era of pugilism is past and gone. America has rivaled and outstripped the Old World in the number, and in many cases, in the severity of the criminal statutes of the separate

states, rendering prize-fighting highly penal. But a few years ago the states with statutes directed against prize-fighting were less than half a dozen. In 1897 Nevada was the only state which had not legislated against degrading exhibitions of this character. In order to prevent the occurrence of prize-fights in less-settled districts, the Catron bill was passed through Congress, declaring prize-fighting illegal in the various territories, and prescribing severe punishments for the infraction of the law. Public opinion had become thoroughly aroused and decided against pugilists, and as a result of the rigid enforcement of the law, the year 1895 saw the principals in a contest of this description crossing to the neighboring republic of Mexico, where alone they were able to decide their differences. For those who care further to pursue the history of the "noble art of self-defense," as pugilism has been called, mention may be made of Egan's *Boxiana* (5 vols., 1818); *Fistiana* (1863); *American Fistiana* (1876); H. D. Miles's *Pugilistica* (2 vols., 1880); "Pendragon's" (Henry Sampson) *Modern Boxing* (1878); J. B. O'Reilly's *Ethics of Boxing and Manly Sport*; Pollock and Grove's *Fencing, Boxing and Wrestling*, in the Badminton Library Series (1889); and R. J. Allanson-Winn's *Boxing* (1890).

PUKHTO. See AFGHANISTAN, Vol. I, p. 238.

PULASKI, a village, one of the capitals of Oswego County, north-central New York, five miles from Port Ontario, on the lake of that name, 20 miles N.E. of Oswego, and 30 miles S.S.W. of Watertown, on the Rome, Watertown and Ogdensburg railroad; contains a courthouse and an academy; has two paper-mills, four flour-mills, two planing-mills, an iron foundry, a machine-shop and a cheese factory. Population 1890, 1,517.

PULASKI, a village and the capital of Giles County, southern Tennessee, 67 miles S. of Nashville, on the Louisville and Nashville railroad; contains a jail, a courthouse and a fine town hall; also Giles College and the Martin Female College, two cotton-mills, two tanneries, and planing and flour mills. The village is in a farming and stock-raising district. Population 1890, 2,274.

PULASKI, BOMBARDMENT OF FORT. This fort, situated on Cockspur Island, at the mouth of the Savannah River, defended the approach to the city of Savannah. During the Civil War it was bombarded and captured by the United States forces under General Gillmore. The besiegers used 36 pieces of artillery, placed along the shore of Tybee Island, at distances ranging from 1,650 to 3,400 yards. The first day's bombardment, April 10, 1862, lasting ten hours, made a partial breach, and to prevent the Confederates from repairing the damage by sand-bags, firing was continued throughout the night. The next morning the batteries were again opened and the breach rapidly enlarged, endangering the safety of the powder-magazine. At two o'clock the fort surrendered. The number of shots fired by the be-

siegers was 1,354, and of shells 4,221. It has been estimated that 110,643 pounds of metal struck the breached portion of the wall, equal to 2,458 pounds per lineal foot, and that the average distance of the guns from the wall was 1,687 yards.

PULASKI, CASIMIR, a Polish count and patriot; born in Podolia, March 4, 1748. He joined his father and brothers in the struggle against King Stanislaus Augustus, and after their death became commander of the insurgents and attempted to seize the king in Warsaw. Failing in this, he was outlawed, and sought refuge in various countries. In 1775 he made the acquaintance of Benjamin Franklin in Paris; arrived in Philadelphia in 1777; joined the American army as a volunteer and distinguished himself in a number of engagements; was made brigadier-general by Congress. At the siege of Savannah he commanded the whole cavalry, both French and American, and in the assault received a wound and was taken on board the United States brig *Wasp*, where he died, Oct. 11, 1779. His body was buried at sea, but the funeral ceremony took place afterward in Charleston. The citizens of Savannah erected a monument to his memory. See also SAVANNAH, Vol. XXI, p. 324.

PULITZER, JOSEPH, an American journalist; born in Budapest, Hungary, April 10, 1847.



JOSEPH PULITZER.

Having been educated in his native city, he removed to America while yet a youth, where he obtained a position as a reporter for the *Westliche Post*, St. Louis, then under the editorial management of Carl Schurz. Later he became managing editor and finally controlling proprietor of the journal. In 1869 he was chosen to the Missouri legislature; in 1872

was a delegate to the Cincinnati convention which nominated Horace Greeley for the Presidency; in 1874 was elected member of the state constitutional convention; in 1880 was delegate in the Democratic national convention, being a member of the committee chosen to draft a platform; and in 1884 was elected member of Congress, but shortly resigned his seat, owing to pressure of journalistic work. In 1878 he founded the *St. Louis Post-Dispatch*, acquiring a leading control of the paper. His crowning success as a journalist dates from his purchase of the *New York World* in 1883. Under his untiring energy the precarious existence of the paper was speedily rehabilitated, and to-day the progress and strength of this enterprise are among the marvels of modern journalism. In 1895, according to sworn statements of its sole proprietor, Mr. Pulitzer, the paper maintained throughout the year a circulation of 560,000 copies daily, the Sunday edition obtaining as a Christmas issue a total of 543,232.

PULKOWA, OBSERVATORY OF The great observatory of Pulkowa, Russia, under its first director, W. Struve, who devised superior instruments, acquired great celebrity. Its work in the preparation of accurate catalogues of the principal fixed stars has been the standard for the world for many years. In 1885 a new refracting telescope of 30-inch aperture and 45 feet focal length was erected. The object-glass was made by Alvan Clark of Cambridge, Massachusetts, and the mountings by the Repsolds. The tube is cylindrical, of riveted steel plates, graduated in thickness from the center to its ends, and bolted by powerful flanges to a strong, short cast-iron central tube. A new feature of this instrument is the platform at the lower end, where an assistant can view the hour-circle by one eyepiece and the declination-circle by another, and where he can also set the telescope to any hour-angle by one wheel, or to any declination by another. The eye-end has a micrometer and its illumination for the position-circle, a finder, microscopes for reading the hour and declination circles, and an illuminated dial showing sidereal time, and driven by electricity from the sidereal clock. Provision is also made for the attachment of a spectroscope—all of which, on the authority of Otto Struve, are practical, and all that can be desired. The traveling-stages are the most manageable that have yet been devised. The driving-clock is constructed so as to be practically independent of the power applied to it, or of the force to be overcome. For general description, see OBSERVATORY, Vol. XVII, p. 714; and TELESCOPES, Vol. XXIII, p. 148.

PULLMAN, a town founded in 1880 by George M. Pullman, and since 1890 incorporated with the city of Chicago. It is situated 14 miles S. of the center of Chicago, on the west shore of Lake Calumet, and covers about five hundred acres of land. It is well laid out, and has a complete sewerage and water system, the drainage of the town converging to a central pool, from which the sewage is pumped to a farm three miles distant, and utilized there as a fertilizer. The town is beautified by well-kept open spaces and stretches, flower-beds and lakes. It has a good hotel, and in the Arcade Building a circulating-library and a small theater. In Pullman are located the carshops of the Pullman Palace Car Company, employing about four thousand men; the Allen Paper Car-Wheel Works, Union Foundry, Standard Knitting Works, Terra-Cotta Works, etc., in all employing over six thousand hands. The ownership of all the dwellings is in the car company, the inhabitants being tenants. Provision is made, however, for those desiring to own homes to purchase them on lands adjoining the town. The best sanitary conditions and modern conveniences are secured for all, each paying a proportionate share toward the total cost of maintenance. At Pullman originated, in 1894, one of the severest and most widespread labor strikes of modern times (q. v., under *Strikes*, in UNITED STATES, in these Supplements).

PULLMAN, GEORGE MORTIMER, an American inventor; born in Chautauqua County, New York, March 3, 1831. At the



G. M. PULLMAN.

age of 22 he moved warehouses and other buildings along the line of the Erie canal, then being widened. In 1859 he went to Chicago, and the same year remodeled two railway coaches into sleeping-cars; later, as a contractor, he undertook to raise large brick and stone business blocks to the level of the streets then being filled in, without disturbing the business of the occupants. In this he was successful, using the simple expedient of placing numerous jack-screws underneath and operating them simultaneously. In 1863 he began the building of sleeping-coaches, which are now known all over the world. In 1867 he organized the Pullman Palace Car Company for the manufacture of these coaches on a larger scale. In 1887 he designed the "vestibule train," which practically unites the separate coaches of an entire train into a single car. In 1880 he founded the industrial town of Pullman (q.v.). Mr. Pullman became identified with various public enterprises, and was president of a corporation which constructed the Metropolitan elevated system of New York City. He died suddenly at his home in Chicago, Oct. 19, 1897.

PULLMAN, JAMES MINTON, an American clergyman, brother of George Mortimer Pullman; born in Portland, New York, Aug. 21, 1836; graduated at St. Lawrence Divinity School, Canton, New York, in 1860; pastor of First Universalist Church, Troy, New York, from 1861 to 1868; called to the Sixth Universalist Church, New York City, where he remained until 1885, when he became pastor of the First Universalist Society of Lynn, Massachusetts. He was the first president of the Young Men's Universalist Association of New York City in 1869; secretary of the General Convention of Universalists in 1868-77, and chairman of the publication board from 1869 to 1874. From 1870 to 1885 he was trustee of the St. Lawrence University, and received the degree of doctor of divinity from this institution in 1878. He edited *The Christian Leader* from 1869 to 1873, and in 1882 founded the Children's Country Week Charity.

PULLMAN CARS. See RAILROADS, in these Supplements.

PULMONARIA. See HORTICULTURE, Vol. XII, p. 252.

PULQUE, an intoxicating beverage of the Mexicans and of the inhabitants of Central America and some parts of South America, made from the fermented juice of various species of agave, mainly the maguey (*Agave Americana*), or American aloe. The sap of the plant contains much sugar, and, as pulque, is milky, sour and

ill-smelling, resembling thin buttermilk. The Mexicans consume large quantities of it, and pulque-trains run into the cities as milk-trains do in the United States. It was first made by the Aztecs. See ALOE, Vol. I, p. 597.

PULSE, in physiology. See VASCULAR SYSTEM, Vol. XXIV, pp. 103-106.

PULSOMETER. See STEAM-ENGINE, Vol. XXII, p. 516.

PULU. See HAWAIIAN ISLANDS, Vol. XI, p. 529.

PUMPELLE, RAPHAEL, an American geologist; born in Oswego, New York, Sept. 8, 1837; was educated at Paris, Hanover and Freiberg, Saxony (1854-60). He traveled through the mining districts of Europe, and in 1860-61 was engaged in mining operations in Arizona; was employed by the government of Japan to explore the island of Yezo (1861-63); by the government of China to examine the coal-fields of northern China (1863-64). After crossing Mongolia, Siberia and Russia, he returned to the United States; was professor of mining-engineering and geology at Harvard (1866); in 1870-71 he made a geological survey of the copper region of northern Michigan, a report of which was published in the *Geological Survey of Michigan*; was state geologist of Missouri (1871-73); in 1879 organized the division of economic geology, and prepared *Mining Industries of the United States* for the census reports published in 1886; was vice-president of the International Congress of Geologists, held at Washington in 1891. He wrote numerous articles in scientific journals, and *Geological Researches in China, Mongolia and Japan*, issued by the Smithsonian Institution (1867), and *Across America and Asia* (1870).

PUMPKIN. See GOURD, Vol. XI, p. 4.

PUMPS. See HYDROMECHANICS, Vol. XII, pp. 532-535; AIR-PUMP, Vol. I, p. 429; PNEUMATICS, Vol. XIX, pp. 246, 247; and MINING, Vol. XVI, p. 458.

PUNA OR DESPOBLADO. See BOLIVIA, Vol. IV, p. 12.

PUNCH AND JUDY. See PUNCHINELLO, Vol. XX, p. 106.

PUNIC WARS. See ROME, Vol. XX, pp. 747, 748.

PUNK. See TOUCHWOOD, in these Supplements.

PUNO, a department and town. See PERU, Vol. XVIII, p. 675; and in these Supplements.

PUNT. See INCENSE, Vol. XII, p. 719.

PUNTA ARENAS. See PATAGONIA, Vol. XVIII, p. 352; and COSTA RICA, Vol. VI, p. 450.

PURACE. See POPAYAN, Vol. XIX, p. 481.

PURANAS. See SANSKRIT, Vol. XXI, p. 283.

PURCELL, JOHN BAPTIST, an American Roman Catholic archbishop; born in Mallow, County Cork, Ireland, Feb. 26, 1800. He emigrated to the United States in 1818; was educated at Ashbury College, Baltimore, Mount St. Mary's, Emmitsburg, and the Sulpitian College, Paris. He became president of Mount St. Mary's College, Maryland, in 1829, bishop of Cincinnati in 1833,

and archbishop in 1850. In 1851 he received the pallium from the Pope's own hands, and at once set about to found a great theological seminary, Mount St. Mary's of the West. In 1869 he attended the Vatican council and was active in its deliberations. In 1876 his golden jubilee was celebrated with great splendor. In the conduct of his business, financial embarrassments arose, reaching a crisis in 1879, which clouded the closing years of his life. In 1880 he was given a coadjutor and retired. He died at St. Martin's, Brown County, Ohio, July 4, 1883. He was a noted controversialist, the author of a series of school books for Roman Catholic schools and of a number of other publications.

PURDUE UNIVERSITY, a non-sectarian, co-educational institution, located at Lafayette, Indiana; founded as the Indiana Institute of Technology, but the name was changed to Purdue University, in honor of John Purdue, who made the institution a gift of \$150,000; opened in 1874, with 7 professors and 64 students. It has schools in agriculture, in science, in civil, mechanical and electrical engineering, and in pharmacy. It has a farm and campus of 189 acres, 20 buildings, and property and annuities to the value of \$1,700,000. The register of 1896 shows a faculty numbering 62, and 630 students. The number of graduates since its organization is 608. Its library contains 5,918 volumes. The income is derived from land-grant endowment, the Morrill fund, an annual appropriation by the state of Indiana, and incidental charges, in all amounting to \$133,000.

PURINTON, DANIEL BOARDMAN, an American educator and author; born in Preston County, Virginia, Feb. 15, 1850; graduated at the West Virginia State University in 1873; became instructor in George's Creek Academy, and later vice-president of the West Virginia State University; president of Denison University, Granville, Ohio, in 1889. He published *Christian Theism* (1889); *The Contest of the Frogs*, a poem (1888); and numerous pieces of music and hymns, both sacred and secular.

PURITANS. See **INDEPENDENTS**, Vol. XII, pp. 722-729.

PURPLE MEDICK OR LUCERNE. See **AGRICULTURE**, Vol. I, p. 378.

PURPLE OF CASSIUS, a purple precipitate obtained by the action of stannous and stannic chlorides on gold chloride. So called because first described by Andreas Cassius of Leyden. Its composition varies according to the method of preparation, so that it contains from twenty to forty per cent of gold along with tin and oxygen. Though the dry powder is often brown or bluish, it gives to glass a beautiful ruby color, and to porcelain violet and red tints, and as the color is permanent, though expensive, it is extensively used in the manufacture of the finer grades of glass and porcelain.

PURPURA. See **MOLLUSCA**, Vol. XVI, pp. 673, 676.

PURPURINE. Trioxanthraquinone, 'a dye which occurs, probably as a glucoside, in madder-

root. It is obtained by heating alizarine with manganese dioxide and sulphuric acid, and in other ways. It forms orange-colored crystals containing one molecule of water, and when anhydrous, is dark red, and melts at 253°. It dissolves in water with dark yellow, in alkalis with red color. With alum mordants it gives a fine scarlet color, more yellowish than alizarine, but as it is more expensive than isopurpurine, which gives nearly the same shade, it is not extensively used.

PURÚS, a river of South America; rises in the Gulf of Peru, and flows east-northeast across part of Bolivia into Brazil, and then enters the Amazon, about one hundred miles west-southwest of Manaos. It is a very crooked stream, with numerous side channels, and is very picturesque in parts. From source to mouth its length is about nineteen hundred miles, but in a direct line is only nine hundred miles. Steam-navigation opened in 1869. On its banks is a population of some fifty thousand, engaged in the india-rubber trade.

PUS. See **SURGERY**, Vol. XXII, p. 683.

PUSHKIN. See **POUSHKIN**, ALEXANDER, Vol. XIX, p. 648.

PUT-IN-BAY, a village and summer resort on a small island of the Wine Island group, a part of Ottawa County, northwestern Ohio, situated on Lake Erie, 40 miles E. of Toledo. Numerous small islands close together constitute a resort where many people from Toledo, Sandusky, Cleveland and other points spend their summers. The United States ship *Michigan*, the oldest man-of-war in the American navy, and the only one on the lakes, is stationed here most of the time. Commodore Perry gained an important victory over the English near this place, Sept. 10, 1813. Permanent population 1890, 1,148.

PUTNAM, a town in Windham County, northeastern Connecticut, 25 miles S. of Worcester, and 33 miles N. of Norwich, on the Norwich and Worcester railroad, where the latter intersects the Eastern Division of the New York and New England road. It is an attractively laid out and neatly built New England town, containing several churches, a high school and school buildings, one national bank, one savings bank; has manufactures of silk, cotton, woolen goods, boots, shoes and slippers, steam-heaters, cutlery and carriages. There are several lumber-yards and wood-working plants. Population 1890, 6,612.

PUTNAM, FREDERICK WARD, an American anthropologist; born in Salem, Massachusetts, April 16, 1839. In 1856 he entered the Lawrence Scientific School under Professor Agassiz; on the foundation of the Peabody Academy of Science in 1867, became director of the museum; became permanent secretary of the American Association for the Advancement of Science in 1873, and in 1875 curator of the Peabody Museum of Archaeology and Ethnology at Cambridge. From 1876 to 1878 he had charge of the Agassiz collection of fishes at the Museum of Comparative Zoölogy, and in 1886 was appointed professor of American archaeology and ethnology at Harvard. He was chief of the department of anthropology at the

World's Columbian Exposition at Chicago in 1893.

PUTNAM, GEORGE PALMER, an American publisher; born in Brunswick, Maine, Feb. 21, 1814;



G. P. PUTNAM.

entered a bookstore in New York in 1828; became a partner in the publishing house of Wiley and Putnam in 1840; resided in London (1840-47), conducting a branch house; returned to New York and began business on his own account in 1848; with the assistance of George William Curtis, established *Putnam's Magazine*, which ran from 1853 to 1856, was re-established in 1868, and merged with *Scribner's Monthly* in 1870. He was collector of internal revenue in New York from 1863 to 1866, when, with his sons, he founded the publishing house of G. P. Putnam and Sons (now G. P. Putnam's Sons). He was one of the founders of the Metropolitan Museum of Art, and in 1872 its honorary superintendent. He was also appointed chairman of the committee on art in connection with the Vienna Universal Exposition. Among his published works are *Chronology; or, An Introduction and Index to Universal History, Biography and Useful Knowledge* (1833); *The Tourist in Europe* (1838); *A Pocket Memorandum Book in France, Italy and Germany* (1848). He died in New York, Dec. 10, 1872.

PUTNAM, ISRAEL, an American patriot and soldier; born in that part of Salem, Massachusetts, since set off as the town of Danvers, Jan. 7, 1718. At the age of twenty he married and removed to Windham County, Connecticut, where for years he cultivated his farm, which was considered one of the finest in New England, giving especial attention to wool-growing and the raising of fruit. By various daring adventures, particularly in entering the cave of a wolf and shooting it, he established a reputation for courage which he maintained in the French War, in which, as captain, he took part, in the battle of Lake George. As a leading member of a band of rangers he greatly embarrassed the enemy during the next two years; in 1757 he was promoted major. He was captured in 1758 by savages, who attempted to burn him alive; but a French officer, Captain Molang, rescued him. Putnam was carried to Montreal, soon freed by exchange, and in 1759 was put in command of a regiment, having been promoted lieutenant-colonel. In 1762 he accompanied an expedition to the West Indies, which ended in the capture of Havana, and in 1764 commanded a Connecticut regiment sent to relieve Detroit, which Pontiac was besieging. On the restoration of peace he returned to his farm. While plowing in a field the news of the battle of Lexington reached him, whereupon he mounted his horse and rode to Cambridge, where soon

after he had chief command of the forces of the colony, with the rank of brigadier. He fought at Bunker Hill, and was commissioned major-general by Congress. After the capture of Boston, Putnam was sent to New York, where he took command, and afterward to Philadelphia, to complete the fortification of that city. He was then intrusted with the defense of the Highlands of New York, but the forts being captured by Clinton, Putnam was relieved from command, and went to Connecticut, where for two years he was engaged in recruiting the army and co-operating with the forces in the Highlands. While on a visit to his home in 1779, he was stricken with paralysis. His remaining years were spent at home, where he died, May 19, 1790. His strength of mind enabled him to exert a wide influence upon the stirring events of his time, though his success as a commander did not equal his reputation for physical prowess and daring.

PUTNAM, MARY TRAILL SPENCE, an American authoress, sister of James Russell Lowell; born in Boston, Massachusetts, Dec. 3, 1810; married to Samuel R. Putnam, a Boston merchant, in 1832; attained distinction as the mistress of many languages; wrote, in conjunction with Miss Peabody, a *History of the Constitution of Hungary and Its Relations with Austria* (1850); *Records of an Obscure Man* (1861); *The Tragedy of Errors* and *The Tragedy of Success* (1862); dramatic poems illustrative of slavery; was the first to translate from the original Swedish Frederica Bremer's novel *The Neighbors*, and contributed to *The North American Review* and *The Christian Examiner*.

PUTNAM, RUFUS, an American soldier; born in Sutton, Massachusetts, April 9, 1738; without a teacher he became proficient in mathematics and surveying; in 1773 was appointed deputy surveyor of Florida; in the Revolutionary War was chief engineer, with rank of colonel, in charge of the fortifications of New York. With his cousin, Israel Putnam, he constructed the fortifications at West Point; in 1783 was appointed brigadier-general; was a member of the legislature of Massachusetts, and aid to Governor Lincoln in the Shay Rebellion in 1787; founded Marietta, Ohio; was judge of the supreme court of the Northwest Territory in 1789; United States surveyor-general from 1793 to 1803. He died in Marietta, Ohio, May 1, 1824.

PUTREFACTION. See FERMENTATION, Vol. IX, pp. 94, 95.

PUVIS DE CHAVANNES, PIERRE, a French painter; born in Lyons, Dec. 14, 1824. He was a pupil of Henri Scheffer and Thomas Couture, and of the Paris École des Beaux-Arts. His first considerable work was a series of five compositions intended for the dining-room of his brother. One of these, *Un Retour de Chasse*, was exhibited at the Salon of 1859. In 1861 he exhibited *La Paix* and *La Guerre*. These two subjects won for him his first public success. He also exhibited *L'Automne* (1864); *La Nuit*, which attracted great attention; *La Vigilance* and *La Fantaisie* (1866); *Le Jeu* (1868); *Massilia* (1869). Shortly

after this date M. de Chavannes began to treat a different order of subjects. In 1881 he exhibited *Le Pauvre Pêcheur* in the Salon; in 1882, *Doux Pays*; in 1884, *Bois Sacré*. As a decorative artist he won renown by his allegorical representations of *History* and *The Sciences*, for the panels of the main amphitheater of the Sorbonne (1887); *Summer* and *Winter*, in the rebuilt L'Hotel de Ville, Paris (1891); and in the Boston Public Library building, *Virgil*, representing bucolic poetry; *Æschylus*, dramatic poetry; *Homer*; etc. He was awarded a medal of honor in 1882, and was created commander of the Legion of Honor in 1889. His mural paintings, remarkable for their grandeur and delicate coloring, have placed him in the front rank of modern decorative painters.

PYÆMIA. See SURGERY, Vol. XXII, p. 678.

PYCNOGONIDA. See ARACHNIDA, Vol. II, pp. 276, 277.

PYGOPODES. See ORNITHOLOGY, Vol. XVIII, p. 45.

PYNCHON, THOMAS RUGGLES, an American educator; born in New Haven, Connecticut, Jan. 19, 1823; graduated at Trinity College, Hartford, in 1841; tutor and lecturer on chemistry in the college (1843-47); deacon at New Haven (1848); priest at Trinity Church, Boston (1849); rector in Stockbridge and Lenox, Massachusetts (1849-55); professor of natural sciences in Trinity (1854); president of Trinity College (1874-83), and afterward professor in the same institution. He received the degree of D.D. from St. Stephen's College, New York, in 1865, and of LL.D. from Columbia College, New York, in 1877. He published an *Introduction to Chemical Physics* (1869), and various sermons, scientific papers and pamphlets, and is a member of several learned bodies.

PYNCHON, WILLIAM, an American theologian; born in Springfield, Essex, England, in 1590; emigrated to New England in 1630; one of the founders of Springfield, Massachusetts. He published *The Meritorious Price of Man's Redemption* (1650), and was the author of a treatise on the Sabbath, and of other works. He returned to England in 1652, and died in Wraybury, Oct. 29, 1662.—His son, JOHN PYNCHON, born in England in 1621, was brought to New England by his father, and on the latter's return to England succeeded him in the government of Springfield, and inherited his estate in the Connecticut valley. He served with distinction in King Philip's and the first French wars, and in 1680 made a treaty with the Mohawks. He was one of the commissioners to receive the surrender of New York by the Dutch in 1664, a deputy of the general court of Massachusetts from 1659 to 1665, and one of the councilors under Sir Edmund Andros. He died in Springfield, Massachusetts, Jan. 17, 1703.

PYOGENIC COCCI. See SURGERY, AMERICAN, in these Supplements.

PYRAMID LAKE. See UNITED STATES, Vol. XXIII, p. 795.

PYRENE, a compound of carbon and hydro-

gen, having the formula $C^{16}H^{10}$, found in coal-tar. Its constitution is undetermined.

PYRENOMYCETES. See FUNGUS, Vol. IX, p. 834.

PYRHELIOMETER. See THERMOMETER, Vol. XXIII, p. 291.

PYRIDINE, C^6H^5N , a tertiary base which occurs in fusel-oil and in Dippel's animal-oil, and may be made synthetically in a number of ways. It is a strong-smelling liquid, boils at 116° , forms salts with acids and double salts like ammonia, and also a large number of derivatives. In some Continental countries it and its homologues are added to alcohol used in the arts, and therefore duty free, to render it unfit for drinking.

PYROACETIC SPIRIT, an old name for acetone, which is found in the distillate from wood and is used in making chloroform.

PYROGALLOL, TRIOXYBENZOL or PYROGALLIC ACID, a phenol obtained by the dry-distillation of gallic acid and in other ways, in thin plates or needles, bitter, poisonous, soluble in water, alcohol and ether, melting at 115° and boiling at 210° . It is an energetic reducing agent, and is used in gas-analysis and photography, in medicine as an ointment, in psoriasis, and with silver nitrate as a hair-dye.

PYROLA, a genus of evergreen herbs belonging to the family *Ericaceæ*, or heaths. The white or greenish-white flowers are borne in a raceme on a scape which bears rounded leaves at base, and usually grow in rich woods. The popular names are wintergreen and shin-leaf.

PYROLIGNEOUS ACID. See TAR, Vol. XXIII, p. 57.

PYROPE. See GARNET, Vol. X, p. 82.

PYROPHORUS, any substance which takes fire on exposure to air. Many metals, such as iron, nickel, etc., in a finely divided state, as obtained by reduction of an oxide at low temperature, are pyrophoric.

PYRO-PHOSPHORIC ACID. See CHEMISTRY, Vol. V, p. 518.

PYROXYLIC SPIRIT. See METHYL ALCOHOL, in these Supplements.

PYROXYLIN. See GUN-COTTON, Vol. XI, p. 277.

PYRRHA. See DEUCALION, Vol. VII, p. 134.

PYRRHO OF ELIS. See SCEPTICISM, Vol. XXI, p. 379.

PYRUS. See ARBORICULTURE, Vol. II, p. 320.

PYRUS or PIRUS, the genus of *Rosaceæ*, to which belong the apple (*P. Malus*) and pear (*P. communis*). The flowers are well known, and while in the ordinary forms cultivated for fruit have simple leaves, the group of rowan-trees or mountain-ashes have pinnate leaves and are often planted for ornament.

PYTHIA. See ORACLE, Vol. XVII, p. 808.

PYTHIAN GAMES. See GAMES, Vol. X, p. 65.

PYTHIAS. See DAMON, Vol. VI, p. 795.

PYX, TRIAL OF THE. See MINT, Vol. XVI, pp. 483, 484.

QUA-BIRD—QUARRYING MACHINERY

QUA-BIRD OR NIGHT-HERON. See **HERON**, Vol. XI, p. 762.

QUACKENBOS, GEORGE PAYN, an American educator; born in New York City, Sept. 4, 1826. After graduating at Columbia in 1843, he studied law, but relinquished it to become principal of a large collegiate school in New York City, where he remained many years. He was editor of the *Literary Magazine* (1848-50) and of several dictionaries of foreign languages. His productions were chiefly school books, among which were *First Lessons in Composition* (1851); *Advanced Course of Rhetoric and Composition* (1854); *School History of the United States* (1857); *Natural Philosophy* (1859); a series of English grammars (1862-64); one of arithmetics (1863-74); and *Language Lessons* (1876). He died in New London, New Hampshire, July 24, 1881.

QUADRAGESIMA. See **LENT**, Vol. XIV, p. 446.

QUADRANT. See **NAVIGATION**, Vol. XVII, pp. 257, 258.

QUADRATIC EQUATION. See **ALGEBRA**, Vol. I, p. 542.

QUADRATURE OF THE CIRCLE. See **SQUARING OF THE CIRCLE**, Vol. XXII, p. 433.

QUADRUPLEX. See **TELEGRAPH**, Vol. XXIII, pp. 123, 124.

QUAIN, SIR RICHARD, a British physician; born in Malloy, Ireland, Oct. 30, 1816; graduated in medicine at the University of London in 1842, receiving a gold medal and a certificate of special proficiency. In 1846 he became a member of the Royal College of Physicians of London, and in 1871 a fellow of the Royal Society. He was also fellow and vice-president of the Royal Medico-Chirurgical and Medical societies of London, and president of the Pathological and Harveian societies. In 1885 he was made physician extraordinary to the Queen; in 1889 received the degree of LL.D. from Edinburgh; and in 1891 was created baronet and elected president of the General Medical Council. In 1882 he edited *A Dictionary of Medicine*, of which 33,000 copies were issued in Great Britain and other countries. He contributed largely to the *Transactions* of learned societies and medical journals.

QUADRUMANA. See **MAMMALIA**, Vol. XV, p. 444.

QUAKERS. See **QUAKERS**, Vol. XX, pp. 147-153; and **FRIENDS, SOCIETY OF**, in these Supplements.

QUAKERTOWN, a borough in Lawrence County, southeastern Pennsylvania, 18 miles S. of Bethlehem, on the Philadelphia and Reading railroad. It contains many manufactories of stoves, musical instruments, agricultural implements, boots and shoes, cigars, carriages and wagons. Population 1890, 2,169.

QUAKING-GRASS, a popular name given to species of the genus *Briza*, notably to *B. maxima*, a European fern sometimes cultivated for ornament. It is a low grass, with broad leaves and drooping, heart-shaped spikelets, which are swollen and purplish, and becoming dry and papery, rattling in the wind, hence often called, also, rattlesnake-grass.

QUANAH, a town and the capital of Harde-man County, northern Texas, on the Fort Worth and Denver City railroad, 175 miles N.W. of Fort Worth. It is in an agricultural and stock-raising district, and has a bank. Population 1890, 1,477.

QUANTITY OR **QUANTICS**, in mathematics. See **MEASUREMENT**, Vol. XV, p. 665.

QUARRYING MACHINERY. The channeling process marks the most important improvement in quarrying within recent years. Machines cut straight channels in the rock, so that it is gotten out in large blocks, the side of the quarry being cut in successive steps or shelves, each perhaps six feet in height. Two types of channeling-machine are used, the track-channeler and the bar-channeler. The Wardwell, Sullivan, and Bryant machines are of the first type, and quite similar. The Bryant machine has an upright boiler and engine mounted on a four-wheeled car, and carrying an upright reciprocating drilling mechanism operating a gang of cutters. It has two cushioned arms or levers working on a common fulcrum, so that the drills may be fed down, and the levers dropped without compression of the rubbers. The frame is made of steel I beams, with malleable iron brackets riveted together. By means of friction-clutches the machine can be held on a track with a grade of one to ten.

The diamond channeling-machine differs from other track-channelers in having a toothed rail. This is done in order to move the machine a set distance after cutting each hole. The holes are drilled on the line with diamond bits.

Saunders' track-channeler for side-hill work is a light machine with a drilling mechanism adjustable to any convenient incline. There is no boiler and engine on the car, the power being supplied through a pipe. The chisels are mounted in a gang fast to the piston, so that the blow is delivered directly. On the up-stroke of the piston the car is fed along, and as a result it chips out the channel, instead of powdering it, as do most machines.

The bar-channeler has two heavy tubular bars mounted horizontally on adjustable weighted legs, and bearing on a traveling-saddle a drill with a gang of cutters. It may be used for either horizontal or vertical cutting, and may be

operated either as an ordinary rock-drill or as a channeler.

The cutters used in channeling are a gang of chisel-shaped bits, variously formed according to the nature of the work. A three-drill gang is used for sandstone, and five-drill gangs for harder cutting. A channeler will cut from 150 to 400 square feet of sandstone or limestone in ten hours, and from 75 to 125 feet of marble in the same time.

The gadder or quarry-bar is a rock-drill mounted on a single and usually horizontal bar. When mounted on wheels it is called a gadding-car or gadding-machine. It is used to drill holes in a straight line, and especially in plug-and-feather work. The holes are formed specially for this work, resembling a circle with two V extensions in the direction in which the rock is to split. These holes being drilled vertically and horizontally all about the block which is to be removed, the feathers are inserted the full depth of the holes. Then the plugs are driven in to spread the feathers, and the rock is split along the line of holes.

The latest form of powder-magazine for quarrymen's use has a stone foundation at least two feet high, to guard it from light burnable material, such as leaves that may accumulate at its base. The sides are built very strongly of six-inch timbers, which are bullet-proof, and calculated to preserve the powder from accidents caused by stray sportsmen or stone-throwing boys. The roof is built rather lightly of corrugated iron, so that in case of explosion the drive will be upward, where it can do the least harm. Thawing-houses for dynamite are built very low, and covered and surrounded with broken rock. Bomb-proof shelters are constructed somewhat similarly of strong timbers, the roofs being heaped over with rocks.

Blasting is now done preferably by electricity. The electric fuses are made with a copper shell or cup, about an inch and a quarter in length, and a quarter of an inch in diameter. Copper wires are inserted at the open end, and imbedded in an explosive fulminate that fills two thirds of the shell. The top of the shell is closed by a plug of melted sulphur. The wires are insulated from each other to prevent a current of electricity passing through the fulminate. This fuse is imbedded in the end of a stick of dynamite, and tied to it with twine. A little magneto-machine in a portable case supplies the electricity for the discharge. The wires are connected at its top by binding-screws, and the pushing of a handle does the rest. A row of holes are connected and exploded at one blast.

Engines, boilers, air-compressors, rock-drills, screens, etc., are used commonly in quarrying, but do not require description here. Rock-breakers and conveyors, however, are built in special forms for the quarryman's use. A preferred form of breaker has a stout, upright column bearing at its top a corrugated inverted steel cone, which is made to rotate within a case so shaped that the

large stones may enter at the top and be crowded down by gravity against the corrugations, which break the stone until it is small enough to fall through the openings at the base of the cone. Then the broken stone is carried off down an inclined plane. Power is received from a horizontal shaft through bevel-gears. At the foot of the breaker is usually arranged a conveyor of iron buckets mounted on an endless chain, so that the stone can be carried up to the screens, or delivered into cars or wagons by chutes. Small breakers are sometimes mounted on heavy portable trucks, carrying a conveyor at one end. Where the amount of broken stone handled is large, pockets are built, similar to coal-pockets, being stout compartments with space underneath for cars or wagons. From these pockets the stone is let out in chutes as desired.

For hoisting large blocks from the quarry, wire ropeways are common. The tackle includes a combined hoist and traveler, so that the blocks may be raised and then run along the wire to the ground above.

Hydraulic washing is a process recently introduced into the quarrying industry. A powerful steam-pump, and nozzles of five or six inches diameter, similar to those used in hydraulic mining, are used to throw streams of water against a bank, removing the loose dirt and leaving the large stones clear for easy working.

C. H. COCHRANE.

QUARTERMASTER-GENERAL, a military officer, and the head of the quartermaster's department, whose duties are to transport troops and munitions of war; to clothe, feed and shelter the soldiers; to construct and repair roads, telegraphs, railways, bridges, wharves, etc., used for military purposes; and, in general, to attend to all disbursements in connection with military operations. In the United States army he has the rank of brigadier-general, and in the British army of major-general or colonel. See also ARMY, Vol. II, pp. 573, 577.

QUARTLEY, ARTHUR, a French-American artist; born in Paris, France, May 24, 1839. He was taken to London when a child, and from 1848 to 1850 studied at Westminster. In 1851 he removed to the United States, and soon afterward was apprenticed to a sign-painter in New York, where he followed his trade until 1862. He then went to Baltimore, and for ten years was engaged in business, devoting his leisure hours in the mean time to the study of painting. In 1873 he opened a studio, and in 1875 he returned to New York, where he soon became widely known as one of the foremost of American marine painters. He was elected an associate of the National Academy in 1879, and became an academician in 1886. Among his paintings are *Morning Effect; North River; Close of a Stormy Day; From a North River Pier Head; An Afternoon in August; Trinity from the River; Off the Isles of Shoals*. He died in New York City, May 19, 1886.

QUASS, a liquor. See LARCH, Vol. XIV, p. 310.

QUATERNARY ERA. See GEOLOGY, Vol. X, pp. 365-370.

QUATERNARY LAKE. See *Great Basin*, under UNITED STATES, Vol. XXIII, pp. 794, 795.

QUATRE-BRAS, BATTLE OF. See NAPOLEON, Vol. XVII, p. 224.

QUATREFAGES DE BRÉAU, JEAN LOUIS ARMAND DE, a French anthropologist; born in Berthézème (Gard), Feb. 10, 1810; studied at Strasbourg, where he took the degree of M.D., and began to write on subjects of natural philosophy as early as 1829. In 1838 he was called to the chair of zoölogy at Toulouse, but soon resigned and went to Paris. He was elected professor of natural history in the Lycée Napoléon in 1850, and a member of the Academy of Sciences in 1852; was nominated a chevalier of the Legion of Honor in 1845; called to the chair of anthropology and ethnology in the Museum of Natural History at Paris in 1855; promoted grand officer of the Legion of Honor in 1863, and elected president of the French Geographical Society in 1889. His chief works are *Souvenirs d'un Naturaliste* (1854); *Métamorphose de l'Homme et des Animaux* (1862); *Histoire de l'Homme* (1869); *La Race Prussienne* (1879); *Hommes Fossiles et Hommes Sauvages* (1884); *Histoire Générale des Races Humaines* (2 vols., 1886, 1889). He died Jan. 12, 1892.

QUAY, MATTHEW STANLEY, an American public man; born in Dillsbury, Pennsylvania, Sept. 30, 1833; graduated at Jefferson College in 1850; was admitted to the bar in 1854; elected prothonotary of Beaver County in 1856, and re-elected in 1859; colonel of the One Hundred and Thirty-fourth Pennsylvania Volunteers; lieutenant-colonel, and assistant commissary general; military state agent at Washington; private secretary to the governor



M. S. QUAY.

of Pennsylvania; major, and chief of transportation and telegraphs; military secretary to the governor of Pennsylvania (1861-65); member of the legislature (1865-67); secretary of the commonwealth (1872-78); recorder of the city of Philadelphia and chairman of Republican state committee (1878-79); secretary of the commonwealth (1879-82); delegate-at-large to the Republican national conventions of 1872, 1876 and 1880; state treasurer (1885); elected to the United States Senate (1887); delegate-at-large to the Republican national convention of 1888; chairman of the Republican national committee, and conducted the campaign which resulted in the election of Harrison and Morton. He was re-elected to the Senate for the term 1893-99.

QUEBEC. The Province of Quebec, formerly Lower Canada, and for 150 years the seat of French dominion in the New World. (For general geographical and historical description, see QUEBEC, Vol. XX, pp. 165-167.) Much of the country is heavily wooded, the hilly ranges—the Laurentides and the Eastern Alleghanies—being clothed with

dense forests of conifers and hardwoods, while the valleys abound in cedar, spruce and pine. The scenery is bolder and more picturesque than that of its sister province to the west; and the tourist finds a great source of attraction in the two historic French-speaking cities, Montreal and Quebec, and in the quaint manners and customs of the still mediæval peasant. Besides the cities and towns of the province, there are five distinct centers of colonization, each with large areas for homesteading. These are: 1. The Eastern townships, now French though originally settled by the British, lying between Montreal and the Maine boundary; 2. The valley of the Ottawa; 3. The valley of the St. Maurice; 4. The valley of the Saguenay and the region of Lake St. John; and 5. The Gaspé district, between New Brunswick and the Gulf of the St. Lawrence.

Quebec is rich in minerals of much economic value, though the mines as yet are undeveloped practically. There is the best of building-material in the large quarries of gray and white granite, of which the public buildings of Montreal are constructed; there is also much limestone, slate-stone, plumbago, mica, phosphates, asbestos, and rich veins of copper, nickel and iron-ore. There are also considerable traces of gold, particularly in Beauce County, near the frontiers of the province, and south of Quebec. Another large source of provincial wealth is lumber, which is exported heavily, though not now in square timber, the trade in which used to be monopolized by the city of Quebec and caused its wharves to be thronged with shipping. That halcyon era has passed for the ancient capital, and with it has gone the ship-building industry. What trade there is in lumber has betaken itself, in the main, to Sorel, Three Rivers and Montreal. The fish industries of the province continue to flourish, and there is still a considerable export of furs. At Quebec city tobacco is manufactured largely now, and there are flourishing factories of boots and shoes. Agriculture is a chief occupation of the people, but the export of farm produce is limited, owing to the small holdings of the *habitants* and their primitive methods of farming. Quebec is the one province in the Dominion in which the tobacco-plant is cultivated to any extent. The yield for 1891 was close upon four million pounds.

Montreal, the largest city in the Dominion and the head of ocean navigation, is the chief center of Canadian commerce, and the principal summer shipping-port of Canada. It is the great distributing-point, via the railways and canals, for the entire country, and it has a large and fast-expanding commerce, somewhat handicapped, however, by French inertia. Here are large sugar-refineries, cotton-mills, tobacco factories and other progressive industries which have the benefit of cheap labor. The population of Montreal in 1891 was 216,500; that of Quebec City was 63,090; the population of the province in 1891 was 1,488,535, of which only about 300,000 are English-speaking. The commerce of the province has the facilities of fourteen local banks, with an aggregate capital of close upon \$35,000,000, and total assets of \$162,000,000. The two chief institutions are the Bank of Montreal, with

a capital of \$12,000,000, and the Merchants' Bank of Canada, with a capital of \$6,000,000.

The province is governed under a lieutenant-governor, by an executive council of nine members (two of them without portfolios), responsible to the legislative assembly, which has now 73 members, the number of members having increased in 1889 from 65 members. There is also a legislative council of 24 members. To the Dominion Parliament the province sends 65 representatives, and its quota of senators is 24. The net annual revenue is \$4,250,000, which, however, does not meet the current expenditure by \$250,000 annually. The province has a large gross debt, amounting in 1894 to over \$30,000,000, with assets of only \$11,000,000. The debt has doubled in 12 years.

The large increase in the provincial debt has come about, in the main, in consequence of the freedom with which the French province has been allowed to deal with its finances, the burden of which must fall heavily upon the British commercial community, the chief taxpayers, who, being in the minority, have little power to check or restrain the expenditure.

The chief religious denomination in the Quebec province is the Roman Catholic, of whom, in 1891, there were 1,291,709. The Church of England had a membership of 75,472; the Presbyterians, 52,659; the Methodists, 39,416; the Baptists, 7,981; the Congregationalists, 4,296. Education in the province is directed by a superintendent of public instruction, under a council of 35 members, who form committees for the management of the Roman Catholic and Protestant schools. The schools are maintained chiefly by local taxation, aided by an annual grant from the government of about \$400,000. They are controlled by local boards. The number of Roman Catholic schools in the province is 4,727; of Protestant, 955. The average attendance in the former is 188,352; in the latter, 25,324. There are 5,748 teachers, of whom 4,508 are Roman Catholics, and 1,240 Protestants. The teachers in religious orders number 3,336.

QUEBEC, a city. See Vol. XX, pp. 168, 169.

QUEBRACHO—WOOD. See LEATHER, Vol. XIV, p. 382.

QUEEN'S BENCH, COURT OF. Same as KING'S BENCH. See BENCH, Vol. III, p. 556, and RECORDS, Vol. XX, p. 311.

QUEENSLAND, a British Australian colony. The latest reports place the area of Queensland at 668,497 English square miles, with a sea-coast of 2,250 miles. The population in 1894 was 445,155. In the exercise of authority the governor is assisted by an executive council of 9 members. The Parliament has two houses—the Legislative Council of 41 members, and the Legislative Assembly of 72 members. The electoral districts are 61. The number belonging to the various religious denominations was in 1891 as follows: Church of England, 142,555; Church of Rome, 92,765; Presbyterian, 45,639; Wesleyan, 20,917; Lutheran, 23,383; Baptist, 10,256; other sects, 52,974. Education is compulsory. The number of public elementary schools in 1894 was 699, with 1,470 teachers and an average daily attendance of 45,050 pupils. There were also 168

private schools, with 501 teachers and an average attendance of 9,412. The public expenditure for education was £179,825. The revenues of Queensland for the year ending June 30, 1895, were \$17,065,860, and the expenditures \$16,542,190. The estimated revenue for 1895-96 was \$17,349,440, and estimated expenditure \$17,159,515. For the defense of the colony there is a drilled force of about 2,960 men, 2,000 militia and several gun-vessels ranging from 250 to 450 tons. The live-stock in 1894 numbered 444,109 horses, 7,012,997 cattle, 19,587,691 sheep and 89,677 pigs. The total area under cultivation was 284,552 acres. There were raised 2,684,925 bushels of corn, 545,185 bushels of wheat, and the sugar-cane yielded 91,712 tons of sugar. The amount of coal mined was 270,705 tons; of gold, 679,511 ounces; of silver, 183,158 ounces; of tin, 2,871 tons; of copper, 415 tons; of lead, 451 tons. The total value of imports in 1894 was £4,337,400, and of exports £8,795,559. The shipping in 1894 consisted of 214 vessels, of an aggregate of 23,011 tons. At the close of 1894 there were 2,379 miles of railways, earning \$4,659,515, and expenses \$2,902,385. The same year there were 996 post-offices, with a revenue of \$717,275, and 9,986 miles of telegraph, with 362 stations. The number of banks in 1894 was 11, with a circulation of \$1,496,140. The savings banks had, on Jan. 1, 1895, 51,453 depositors, with \$10,499,460 to their credit.

The question of Australasian Federation has received the attention of the government of Queensland. See AUSTRALIAN FEDERATION, in these Supplements. For a general geographical and historical description, see QUEENSLAND, Vol. XX, pp. 171-174.

QUEEN'S UNIVERSITY (Kingston, Ontario, Canada), founded in 1841 in the interest of the Presbyterian Church in Canada, in connection with the Church of Scotland. The early development of Queen's was greatly hindered by the separation which took place in the Presbyterian Church in Canada consequent on the disruption of 1844 in Scotland. An improvement in the position of Queen's, however, took place on the reunion of the Presbyterian bodies in Canada in 1874, and as the result of the more effective organization conferred on it by an act of the Ontario legislature of that year. It is now a flourishing institution, having a well-equipped teaching-staff in arts, science and theology, with a medical college in affiliation. Its later career owes much to the enthusiasm of its principal, Dr. George M. Grant.

QUELPAERT. See COREA, Vol. VI, p. 391.

QUERCIA, JACOPO DELLA, an Italian sculptor; born near Siena, about 1378. He was the first to use wood and stucco in the production of a statue. He made the monument to *Ilaria del Carreto*, wife of Paolo Guinigi, in the Church of San Martino in Lucca, and the principal door of San Petronio in Bologna. The execution of a beautiful fountain, the *Fonte Gaia*, in the Piazza del Campo, led to his being called *Jacopo del Fonte*. He was knighted, and made chief of the works of the Cathedral. He died in 1442.

QUERÉTARO, a state of Mexico, inclosed on

the west by Guanajuato and on the east by Hidalgo, in the central southern portion of the country. Its area is 3,556 square miles. It lies entirely in the region of the high plateau, but the surface is mountainous, especially in the northern part; the valleys are fertile, and the higher slopes are covered with pine and oak forests; the climate resembles that of southern California. Its products are maize and cotton, with grain and fruits, and it has mines of silver, lead, copper and iron, with manufactures of woolen cloth, soap, pottery and iron-ware. The capital of the state is Querétaro (q.v., Vol. XX, pp. 175, 176), with a population of 36,000. Population of the state in 1893, 213,525.

QUESADA, GONZALO XIMENEZ DE, a Spanish adventurer; born in Grenada, in 1498. The Spanish settlement of Santa Marta had jurisdiction over the northern coast of Columbia, South America, and of an unexplored region to the southward, when in 1535 its governor, Pedro Fernandez de Lugo, made Quesada his chief lieutenant. With 600 infantry, 85 cavalry and many Indians, Quesada started from Santa Marta, April 5, 1536, upon an expedition into the interior. While in the mountains, news came to him of the Kingdom of Chibchas of Bogotá and its great riches. Though his force had been reduced, from the ravages of fevers and hostile Indians, to 166 men, he decided to conquer this powerful nation. He defeated the Indians, occupied Bogotá, secured a large amount of gold, and founded the Spanish city of Santa Fé de Bogotá, Aug. 6, 1538. Quesada soon afterward was joined by two other Spanish adventurers from Peru and Venezuela, and the three went to Spain to present to Charles V their claims to the country. Being dismissed by the emperor, Quesada squandered in dissolute living his treasures brought from Bogotá. He was afterward made marshal of New Grenada, took part in some further conquests, and died at an advanced age. The account of the conquest which he wrote has been lost.

QUICHE INDIANS. See YUCATAN, Vol. XXIV, pp. 759, 760.

QUICHUA INDIANS. See PERU, Vol. XVIII, p. 676.

QUICKSILVER. See MERCURY, Vol. XVI, p. 31.

QUILLER-COUCH, ARTHUR T., an English novelist, whose stories appear usually over the initial "Q.," was born at Polperro, Cornwall, Nov. 21, 1863. He was educated in Devonshire and at Clifton College, after which he passed to Trinity College, Oxford, where he graduated a first-class in classics. While at college he contributed to the *Oxford Magazine*, and for a time was classical lecturer at Trinity. He afterward proceeded to London, and was launched on a literary career. With J. M. Barrie, he became a member of the staff of *The Speaker*, in which literary weekly many of his stories and literary criticisms first appeared. His principal publications are *Dead Man's Rock* (1887); *The Astonishing History of Troy Town* (1888); *The Splendid Spur* (1889); *The Warwickshire Avon* (1891); *The Blue Pavilions* (1891); *Noughts and Crosses* (1892); *I Saw Three Ships* (1892); *The Delectable Duchy* (1893); *Green Bays: Verses and Parodies* (1893); *The Golden Pomp: A Procession of English Lyrics from Surrey to Shirley* (1895); *Ia: A Love Story* (1895); *Wandering Heath* (1896); and a series of cleverly-written criticisms, entitled *Adventures in Criticism* (1895).



A. T. QUILLER-COUCH.

QUILLWORTS, the common name of species of the genus *Isoetes*, a small group of Pteridophytes. They are grass-like plants, with narrow leaves growing in a cluster from short, tuber-like stems, and grow in water or muddy places. The spore-cases are borne upon the leaf-bases within, and are of two kinds, producing large spores (*macrospores*) and small spores (*microspores*). See HETEROSPORY, in these Supplements.

QUILLS. See FEATHERS, Vol. IX, p. 60.

QUILOA OR KILWA. See ZANZIBAR, Vol. XXIV, p. 768; and KILWA, in these Supplements.

QUINCY, a city and the capital of Adams County, Illinois, on the Chicago, Burlington and Quincy, the Hannibal and St. Joseph, the Quincy, Omaha and Kansas City, the St. Louis, Keokuk and North-Western and the Wabash railroads. It has 80 miles of improved streets, 4 public parks, 2 opera-houses, 2 state armories, 2 hospitals, 2 orphan asylums, 9 public schools, 13 parochial schools and a medical and a literary college. Quincy has a very well-organized fire department, and among its finest buildings are the State Soldiers' and Sailors' Home, which has a very fine library, the United States Government Building and the courthouse, surrounded by a handsome park. Its chief industries comprise a pork-packing establishment, several stove foundries and machine-shops, 15 carriage and wagon factories, icehouses, brickyards, cigar and chewing-tobacco factories, flour-mills, cooper-shops, breweries, saddle and harness factories, lime-works, three organ factories, paper-mill, furniture factories and steam-governor works; it has also a large public library. Chaddock College (Methodist Episcopal) organized in 1853 and located here, is a co-educational institution, and in 1896 had 15 instructors, 130 students and a library containing 1,500 volumes. Population 1890, 31,494. See also QUINCY, Vol. XX, p. 182.

QUINCY, a town and seaport in Norfolk County, Massachusetts. Population 1890, 16,723. See QUINCY, Vol. XX, p. 182.

QUINCY, a village of southern Michigan, on the Lake Shore and Michigan Southern railroad, 31 miles S.W. of Jackson. It has two sawmills and manufactories of staves, headings, sash and doors. Population 1890, 1,092; 1894, 2,452.

QUINCY, the name of a noted Massachusetts family. For two JOSIAHS, see QUINCY, Vol. XX, pp. 182, 183.—EDMUND QUINCY, American statesman, was born in Braintree, October, 1681; graduated at Harvard 1699; a member of the council and judge of the supreme court from 1718 until his death. In 1737 he went to England to plead the case of Massachusetts in a boundary dispute with New Hamp-

shire. He died of smallpox in London, Feb. 23, 1738, and the colony ordered a monument to be erected there to his memory.—Another EDMUND QUINCY, son of Josiah Quincy, was born in Boston Feb. 1, 1808; graduated at Harvard in 1827. He was secretary of the American Anti-Slavery Society, and his contributions to the anti-slavery press for many years were able and valuable. He published a novel, *Wensley* (1854), and an excellent biography of his father (1867). He also edited his father's *Speeches* (1875). He died in Dedham, May 17, 1877.—His brother, JOSIAH QUINCY, was born in Boston, Jan. 17, 1802; graduated at Harvard in 1821; was president of the Massachusetts senate in 1842, and mayor of Boston from 1845 to 1849. He promoted several improvements in municipal affairs, especially the introduction of the water-supply from the Cochituate River. Near the end of his career he contributed to the *Independent* sketches which have been collected under the name *Figures of the Past* (1882).

QUINISEXT COUNCIL. See CANON LAW, Vol. V, p. 16.

QUINOA, the native name of *Chenopodium quinoa*, one of the goosefoots of Central America, and cultivated for its nutritious seeds.

QUINSY. See THROAT DISEASES, Vol. XXIII, p. 320.

QUINTARD, CHARLES TODD, an American clergyman; born in Stamford, Connecticut, Dec. 22, 1824. He studied medicine with Dr. Valentine Mott, and graduated at the University of the City of New York, in 1847. In 1851 was professor of physiology and pathological anatomy in the Medical College at Memphis, Tennessee; was one of the editors of the *Memphis Medical Recorder*. In 1856 he took orders in the Protestant Episcopal Church; in 1857 became rector of Calvary church, Memphis, and the following year of the Church of the Advent, Nashville, Tennessee. During the Civil War he was chaplain of the First Tennessee regiment. He was chosen bishop of Tennessee in 1865; was vice-chancellor of the University of the South, at Sewanee, Tennessee, and labored for the promotion of Christian education in a number of institutions of learning. He received the degree of LL.D. from Cambridge, England, in 1867.

QUIRINAL, one of the seven hills of Rome, and the palace. See ROME, Vol. XX, pp. 731-835.

QUIRITES. See ROMAN LAW, Vol. XX, p. 669.

QUITCLAIM, a form of release by deed in use in the United States. The character of this deed is similar to that of the release in English law. See RELEASE, in these Supplements.

QUITMAN, a village and the capital of Brooks County, southern Georgia, 14 miles E. of Valdosta, on the Savannah, Florida and Western railroad, and on the Ocopilco River. It has an academy, five churches and two newspapers. Population 1890, 1,868.

QUITMAN, JOHN ANTHONY, an American lawyer and soldier, was born in Rhinebeck, New York, Sept. 1, 1799. He was educated for the Lutheran ministry, and in 1816 was appointed tutor in the classical department of Hartwick Seminary. Two

years later he became a professor in Mount Airy College, Germantown, Pennsylvania, and while there decided to adopt the legal profession instead of the ministry. In 1819 he went to Ohio and studied law, and in 1821 settled in Natchez, Mississippi. He was elected to the legislature in 1825; was chancellor of the state from 1828 until 1834; and afterward was president of the state senate, at which time he also was charged with the functions of governor, that office having become vacant. In 1836, at the head of a body of men which he had raised, he aided the Texans against Mexican incursions, and in 1846 took part in the Mexican War as a brigadier-general under General Taylor. He won distinction by his conspicuous bravery at Monterey, Vera Cruz and Alvarado, and assisted in taking possession of the city of Puebla, for which he was brevetted major-general. Later, he stormed the defenses of Chapultepec, and General Winfield Scott appointed him governor of the City of Mexico. On his return to the United States he was elected governor of Mississippi. At that time he advocated the annexation of Cuba to the United States, and was prosecuted for alleged complicity in the filibustering expedition under Lopez. The jury disagreed, but General Quitman resigned the governorship, and from 1854 until 1858 he represented his district in Congress. He died in Natchez, July 17, 1858.

QUORUM, as applied to deliberative or other organized bodies, means the number of members in a meeting whose presence is necessary to make the proceedings legal. If no specific rule as to the number required has been adopted by the body, a majority of the members is regarded as a quorum. But less than a majority may, by a rule, be made a quorum; the British House of Commons requiring forty members, the United States House of Representatives a majority of all the members, the New York Senate the presence of three fifths of the members. Because of its great importance in legislation the question as to what constitutes a quorum recently assumed in the United States great interest. Each house of Congress makes its own rules of order, which must be in harmony with the constitution. The constitution provides that "a majority of each house shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members." In view of this clause of the constitution, the Thirty-seventh Congress, to which several states had failed to send representatives, decided that a majority of the members chosen constituted a quorum to do business. In the Fifty-first Congress (1889-91), the point of order was raised that no quorum had voted on a certain question under consideration, 161 yeas and 1 nay having been announced by the speaker, or 162 votes—less than a majority. Thereupon the speaker (Thomas B. Reed) directed the clerk to enter upon the journal the names of certain members as "present and refusing to vote," and ruled that a quorum was present within the meaning of the constitution. The grounds for this ruling, as stated at the time by the speaker, were substantially these: That certain members who did not vote when their names were called

were bodily present; that the speaker of the Senate of New York had decided in 1883, in a similar case, that its constitutional provision as to a quorum was entirely satisfied by the presence of the members, even if they did not vote; that in a similar case in the legislature of Tennessee in 1885 the speaker directed the clerk to count as present those there but not voting, and a quorum thus being present, he declared the bill under consideration passed; that it has always been the practice in the Parliament of Great Britain for the speaker to determine by count whether or not a quorum is present; that the constitution of the United States has a provision for compelling the attendance of absent members in order to obtain a quorum. If members can be present and not be counted as a quorum, that provision is nugatory; and inasmuch as the constitution provides for the attendance of members, attendance only is enough, otherwise the constitution would have provided for more.

The following extracts from the ninth edition of *Cushing's Law and Practice of Legislative Assemblies* on the subject of quorum are here given in further explanation of the subject:

"In all councils and other collective bodies of the same kind, it is necessary that a certain specified number, called a quorum, of the members, should meet and be present in order to the transaction of business. This number may be fixed precisely in the first instance, or some proportional part established, leaving the particular number afterward to be ascertained, with reference to each assembly, and this may be done either by usage or by positive regulation; and, if not so determined, it is supposed that a majority of the members composing the body constitute a quorum. . . . In the United States the number necessary to constitute a quorum, in all the states respectively, and in the Congress of the United States, is regulated by constitutional provision. When the number of which an assembly may consist at any given time is fixed by constitution, and an aliquot proportion of such assembly is required in order to constitute a quorum, the number of which such assembly may consist and the number of which it does in fact consist at the time in question, is the number of the assembly, and the number necessary to constitute a quorum is

to be reckoned accordingly. Thus, in the Senate of the United States, to which, by the constitution, each state in the Union may elect two members, . . . the quorum is a majority of that number, whether all the states have exercised their constitutional right or not. So, in the second branch of Congress . . . the quorum is a majority of the whole number, including the number to which new states may be entitled, whether they have elected members or not, and making no deductions on account of vacant districts."

The courts of many of the states, as well as their legislatures, have taken the same course in regard to the subject of a quorum as did the House of the Fifty-first Congress, which may best be stated in the language of the speaker, as follows:

"We must, therefore, in this House at least, consider the question settled, that if a majority are present to do business, their presence is all that is required in order to make a quorum. If they decline to vote, their inaction cannot be in the pathway of the action of those who do their duty. The idea that silence can be stronger than a negative vote seems to have been unknown to our ancestors. It seems to be a modern parliamentary fiction which has never been able to stand the examination of courts where business questions were involved. I have yet to see a single decision of a court against the position which has lately been taken by the House of Representatives."

QUO WARRANTO. One of its chief uses in the United States is to question the authority of a corporation to continue its operations as such. Throughout the United States the law generally provides that the attorney-general of the state may file the information against a corporation, and in such case he has the exclusive right to do so. He may act without leave of court. Such proceedings frequently are instituted against state, city, county and other public officers who assume official functions without proper authority. The judgment, in case the writ is sustained against an officer or individual, is ouster; against a corporation by its corporate name, it is ouster and dissolution. For a definition of the term and the uses of the proceeding in British law, see *QUO WARRANTO*, Vol. XX. p. 189.

R

RA—RADIATORS FOR INDOOR HEATING

RA, THE SUN GOD. See EGYPT, Vol. VII, p. 716.

RAASAY, a sound and one of the Western isles. The isle belongs to the group of the Inner Hebrides, and lies between the Isle of Skye and the mainland; the Sound of Raasay separating it from the former, and Applecross Sound from the latter. It is 13 miles in length by two and a half miles in greatest breadth. Population, 389. See HEBRIDES, Vol. XI, p. 607.

RABANUS, MAURUS MAGNENTIUS. See HRABANUS, MAURUS, Vol. XII, p. 326.

RABBINICAL LITERATURE. See MISHNAH, Vol. XVI, pp. 502-508; also TALMUD, Vol. XXIII, pp. 35-40.

RABBIS. See JUDAISM IN THE UNITED STATES, in these Supplements.

RABBULA. See SYRIAC LITERATURE, Vol. XXII, p. 829.

RACALMUTO, a town in central western Sicily, in the province of Girgenti, on the crest of a hill 12 miles N.E. from Girgenti. It is said to be of Saracenic origin, has a castle, built by Frederick Chiaramonte in the fourteenth century. It has mines of rock-salt, sulphur and mercury. Population, 13,400.

RACAN, HONORAT DE BUEIL, MARQUIS DE (1589-1670). See FRANCE, Vol. IX, p. 654.

RACCAHOUT, DES ARABES, food prepared from the starch of the acorns of *Quercus ilex* and *Q. balota*, oaks growing in Barbary. It is prepared as a sweetmeat or for use as a beverage by admixture with chocolate, vanilla, etc.

RACE, CAPE, a promontory in the southeast portion of Newfoundland, lat. $46^{\circ} 39' 30''$ N., long. $53^{\circ} 4' 30''$ W.; a very dangerous point for ships sailing between Europe and America. The British government established a revolving light 180 feet high at this point. It is sustained by a tax levied on all ships sailing between Great Britain and Newfoundland and between Newfoundland and the New England states.

RACEMIC ACID. See TARTARIC ACID, Vol. XXIII, p. 69.

RACHEL. See JACOB, Vol. XIII, p. 536.

RACINE, a city and the capital of Racine County, Wisconsin, on the Chicago, Milwaukee and St. Paul and the Chicago and Northwestern railroads. The educational institutions include Racine College (Protestant Episcopal, chartered in 1852), St. Catherine's Academy (Roman Catholic, open in 1866), the McMurphy Home School (Protestant Episcopal, open in 1877), and Racine Academy (non-sectarian). The benevolent institutions are St. Luke's Hospital and the Taylor Orphan Asylum. There are four libraries—the High School, Racine College, the Home School library of 14,000 volumes, and the Young Men's Christian Associa-

tion library. Population 1890, 21,014. See RACINE, Vol. XX, p. 203.

RACINE, LOUIS, a French author, son of Jean Baptiste Racine; born in Paris, Nov. 2, 1692; wrote *La Grace* and *La Religion*, and memoirs on his father's life. He died in Paris, Jan. 29, 1763. See RACINE, JEAN, Vol. XX, pp. 203-209.

RACING, horse-racing. See HORSE, Vol. XII, pp. 199-205, 207-209; also HORSE-RACING and TROT-TING AND PACING, in these Supplements.

RACK, of a quadruped, the method of progressive motion, in which the two feet of one side are placed upon and lifted from the ground at nearly the same moment, alternating with the two feet of the other side. In the trot, the front and hind foot of opposite sides are moved nearly synchronously; in the rack, the feet of the same side.

RACK, in mechanics. See MECHANICS, Vol. XV, p. 755; in torture, see TORTURE, Vol. XXIII, p. 465.

RACK, an intoxicating liquor. See ARRACK, Vol. II, p. 628; COCOANUT PALM, Vol. VI, p. 103; and DISTILLATION, Vol. VII, p. 264.

RADCLIFFE COLLEGE, a non-sectarian institution for the education of young women, organized in 1878 as an "annex" of Harvard University, Cambridge, Massachusetts, and in 1893 named in memory of Anne Radcliffe, the founder of the first scholarship of Harvard college. The instruction given is the same as to the young men, and the teachers are members of the faculty of Harvard University. Prior to 1893 only certificates were granted to students. Degrees now are signed by Harvard's president. In 1896 the president of the faculty was Mrs. Elizabeth C. Agassiz; the number of instructors, 84; and the number of students, 344. Its library contained 8,000 volumes; its total income was \$80,000; and the total number of graduates was 92.

RADIATORS FOR INDOOR HEATING. Radiators for heating by means of steam or hot air are made in the form of hollow vessels or coils of pipe. The latter form is most common, and is varied in arrangement and appearance principally to secure ornamental effects, that the radiator may present a slightly addition to the furnishings of an apartment. Heating by low-pressure steam necessitates a boiler partially filled with water, the maintenance of a water-line and radiators or coils at a proper distance above this line, and equal pressure on all parts of the system, with provision for relieving all radiators and supply-pipes from condensation and returning it automatically to the boiler. Latent heat is absorbed while the water is being converted into steam, which is obtained only while the water is held under a pressure above the atmosphere (unless steam is condensed by mechanical attachments). To utilize this latent heat for warming the air in a room, the steam is condensed by

contact of air with the outside surface of the radiator, and the water thus obtained is returned to the boiler. The system of piping for this method varies with the requirements of different buildings and apparatus. Direct, indirect, or direct-indirect radiators are used, or a combination of all, according to the requirements of ventilation, etc. A direct radiating surface consists of radiators or coils placed in the rooms to be warmed without a supply of fresh air. The heat is absorbed by the air in contact with the radiator, causing it to expand, rise, and become displaced by the heavier, cooler air, which in turn is warmed. An indirect system of heating is effected when the radiators or coils of pipe are placed in the basement or some lower room, and inclosed in chambers, usually boxes lined with tin. Outside air is conveyed to the chambers through ducts, and becoming heated, ascends to the desired points. A direct-indirect radiating surface consists of direct radiators with closed base, outside air being conveyed through a duct to the heating surface, where it is heated and discharged into the room.

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RADICAL AXIS. See CURVE, Vol. VI, p. 718.

RADICLES. See CHEMISTRY, Vol. V, pp. 466, 552.

RADIOLARIA. See PROTOZOA, Vol. XIX, p. 849.

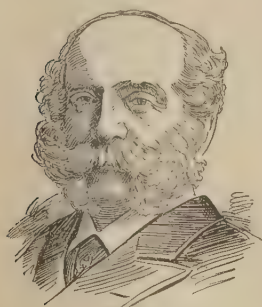
RADIOMETER. See PNEUMATICS, Vol. XIX, p. 249.

RADIOPHONE. See TELEPHONE, Vol. XXIII, pp. 130-134.

RADISH, vegetable. See HORTICULTURE, Vol. XII, pp. 286, 287.

RADIUS. See ANATOMY, Vol. I, p. 827.

RAE, JOHN, a British Arctic explorer; born in the Orkney Islands, Scotland; in 1813. He studied



DR. JOHN RAE.

medicine at Edinburgh, and in 1833 was appointed surgeon in the service of the Hudson's Bay Company. In 1845 he surveyed some seven hundred miles of coast, and in 1846 made a boat-journey to Repulse Bay, where he wintered. In 1847 he traversed seven hundred miles of coast, thus connecting the surveys of Ross and Parry. Returning to London, he joined the expedition under Sir John Richardson in search of Sir John Franklin in 1848. In 1853-54 he made explorations that proved King William's Land to be an island, obtained from the Eskimo information of the fate of Franklin, and secured many relics of Franklin's party. For this discovery he received fifty thousand dollars, offered by the government of Great Britain. In 1860 Rae surveyed the land part of a contemplated telegraph line to America, via the Faroe Islands and Iceland. In 1864 he commenced another telegraph survey from Winnipeg across the Rocky Mountains through the Yellow Head Pass. Some hundreds of miles of the

most dangerous part of the Fraser River were run through in small dug-out canoes, without any guide, a very unusual and perilous undertaking. Rae's publications are very few, consisting of a number of short papers on the Eskimo and other subjects; a brief narrative of the Arctic expedition of 1846-47, and brief reports of his various expeditions addressed to the Royal Geographical Society, which society awarded him a gold medal. He died in London, July 21, 1893.

RAFFLESIA. See PARASITISM, Vol. XVIII, p. 265.

RAFINESQUE, CONSTANTINE SCHMALTZ, an American naturalist; born in Constantinople, Oct. 22, 1783, of French-German parents. He was sent to America in 1802, and, developing a fondness for natural history, made collections of botanical specimens. From 1805 to 1815 he lived in Leghorn and Sicily, and published there *The Flora and Natural History of Sicily*; *Sicilian Ichthyology* (1810); *Sicilian Crustaceous Animals* (1814). Returning to America in 1815, he suffered shipwreck, and all his drawings and valuable manuscripts were lost. He became tutor in the family of Chancellor Livingston, and in 1818 was made professor of botany in Transylvania University at Lexington, Kentucky. In 1830 he went to Philadelphia, and settled there permanently. He was a man of great learning and industry, but his works lack the value of exact statement. He wrote *Annals of Kentucky* (1824); *The American Florist* (1832); *The American Nations* (1836); *Medical Flora of the United States* (1828); *A Life of Travel and Researches* (1836); and *The Genius and Spirit of Hebrew Poetry* (1838). Many of his manuscripts are in the National Museum at Washington. He died in Philadelphia, Sept. 18, 1842.

RAGNAROK. See ÆSIR, Vol. I, p. 210.

RAGONA, DOMENICO, an Italian astronomer and meteorologist; born in Palermo, Sicily, Jan. 20, 1820. While still young he was appointed assistant professor of physics at the University of Palermo. In 1851 he was sent to Germany, at the expense of the government, to perfect his knowledge of astronomy. He studied in Berlin under Encke, and in Bonn under Argelander, and was esteemed greatly by Humboldt. On his return he was appointed director of the Observatory of Palermo and professor of astronomy. In 1860 he was transferred to the Observatory of Modena, Italy. In 1870 he established a network of meteorological field-stations in the province of Modena, the first in Italy. The results of his work in astronomical science have been published in the *Transactions* of the Berlin Observatory, the *Bulletin International*, the *Astro-Meteorological Journal*, *Memoirs of the Society of Natural Sciences*, and other journals. He published numerous papers and dissertations on meteorology, invented many new instruments, and founded the Italian Meteorological Society, presiding over it for the first three years. He was counted among the most illustrious of meteorologists.

RAGUET, CONDY, an American lawyer; born in Philadelphia, Pennsylvania, Jan. 28, 1784; educated at University of Pennsylvania, and studied law. In 1804 went to St. Domingo, and on his return pub-

lished a story of the condition of the island and a circumstantial account of the massacre there in 1805. He was one of the founders of the Philadelphia Savings Fund, and was active in the defense of Philadelphia against the attack of the British in 1812; member of both branches of the state legislature; consul at Rio de Janeiro, Brazil, and in 1825 was appointed chargé d'affaires. He was an advocate of free trade, and wrote *Principles of Free Trade* (1835); *On Currency and Banking* (1839); etc. He was editor of *Free Trade Advocate, Examiner* and *Financial Register*. He died in Philadelphia, March 22, 1842.

RAHBEK, KNUD LYNÉ. See DENMARK, Vol. VII, p. 91.

RAHWAY, a city of New Jersey, on the Pennsylvania railroad. Population 1890, 7,090. See RAHWAY, Vol. XX, p. 222.

RAIIDÆ. See RAY, Vol. XX, p. 299.

*RAILROADS IN THE UNITED STATES.

Transportation by rail has become interwoven with all the great industries of the nation. The Baltimore and Ohio railroad, the first railroad undertaken in the United States having for its object the transportation of passengers and freight, was opened from Baltimore to Ellicott's Mills, a distance of 14 miles, on May 24, 1830. The whole main stem, from Baltimore, Maryland, to Wheeling, 380 miles, was not opened, however, until Jan. 1, 1853.

Following the Baltimore and Ohio, the next important line to be undertaken was the Charleston and Hamburg railroad (afterward the South Carolina, and now [1896] the South Carolina and Georgia), extending from Charleston, South Carolina, to Hamburg, on the western line of the state, opposite Augusta, Georgia. The length of this line is 137 miles. Its construction was begun in 1830 and the whole line was completed and opened for business Oct. 1, 1833, being at that time the longest continuous line of railway in the world. Upon this line the first locomotive built in the United States was run. It was called "The Best Friend of Charleston," and was built at the West Point foundry in Cold Spring, Putnam County, New York. It arrived in Charleston, Oct. 23, 1830, and was placed on the road for an experimental trip, Nov. 2, 1830. On the 15th of January, 1831, the anniversary of the commencement of the construction of the railroad, this engine made its first regular trip.

Although this was the first locomotive to be built in the United States, it was the second to be put into use, the Delaware and Hudson Canal Company having, in 1829, imported the "Stourbridge Lion," an engine constructed by Foster, Rastrick and Company of Stourbridge, England, for use on its Carbondale and Honesdale railroad. The experimental trip of this engine was made Aug. 8, 1829, in charge of Horatio Allen, that being the first and only time that that distinguished engineer ran a locomotive-engine. The "Stourbridge Lion" was found too heavy for the track it was employed upon, and its use was discontinued after a short time.

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The first railroads seem not to have been very remunerative. They were rude structures compared with the roads of the present day; nevertheless, the people continued to build them, and at the close of 1835 about eleven hundred miles of road had been completed. From this period to 1837 vast railroad projects were entered upon, but, owing to the general financial depression, comparatively little was accomplished till about the time of the acquisition of California.

In 1840 there was a well-defined system of railroads in New England, which has Boston for a center. The Eastern railroad was in operation from Boston to Portsmouth; the Boston and Lowell and the Lowell and Nashua formed a continuous line from Boston to Nashua; the Boston and Providence was completed to Providence, and the New York, Providence and Boston continued that line from Providence to Stonington. Of the present Boston and Albany line, three sections were then completed; from Boston to Worcester, 44.63 miles, built by the Boston and Worcester Railroad Company; from Worcester to Springfield, 62.60 miles, built under the charter of the Western Railroad Company; and from Hudson, New York, to Pittsfield, Massachusetts, 46.51 miles,—making a total of 153.74 miles. The last-mentioned section was composed of a portion of the western division of the Western railroad, from the New York state line to Pittsfield, Massachusetts; the remaining portion, all in the state of New York, was built by what was known as the Hudson and Berkshire Railroad Company. This left a gap between Pittsfield and Springfield on the Western railroad, which was completed in 1841, and the whole line opened throughout in September of that year.

In 1840 the Boston and Maine railroad was being operated from Wilmington to Exeter, and the Boston and Lowell tracks were used to gain entrance to Boston. The Norwich and Worcester was in operation between Worcester, Massachusetts, and Norwich, Connecticut, and the New Haven and Hartford was completed between the two points named in its title.

The following statement shows the mileage of railroad in the United States at the end of 1840, in operation and nearing completion:

STATES AND TERRITORIES.	MILES OF RAILROAD.
Maine	14.50
New Hampshire	37.30
Massachusetts	305.99
Rhode Island	43.40
Connecticut	94.50
Total New England states	495.69
New York	373.44
New Jersey	197.05
Pennsylvania	635.35
Delaware	39.19
Maryland	204.36
Total Middle states	1,449.39
Ohio	38.00
Michigan	118.90
Total Western states	156.90

STATES AND TERRITORIES.	MILES OF RAILROAD.
Virginia	301.71
North Carolina	92.10
Kentucky	29.00
South Carolina	204.00
Georgia	275.00
Alabama	46.00
Total Southern states	947.81
RECAPITULATION.	
New England states	495.69
Middle states	1,449.39
Western states	156.90
Southern states	946.81
Total United States	3,048.79

The great movement in the construction of railways, however, dates from the discovery of gold in California. The effect upon the industries and commerce of the country, of the sudden addition of more than \$50,000,000 annually to its circulating medium, was prodigious. For the increased wealth and newly-created enterprise of the nation, the railway offered the most attractive and appropriate field. From 1849 to 1857, 17,138 miles of railway were constructed. Then came a great commercial revulsion, which, commencing in the United States, swept round the world. But the nation had grown too strong to suffer anything more than a temporary check. The lines of railroad which had been constructed penetrated every important portion of the country, and gave a high commercial value to all its products. Labor everywhere was thus enabled to reap, even in the midst of the great depression that prevailed, a remunerative return.

In 1848 a continuous line of railway was formed between Boston and New York City by the completion of the New York and New Haven railroad, its formal opening occurring on the first day of January, 1849.

In 1851 the Erie was opened from the Hudson to Lake Erie. Soon after the opening of the Central line, in addition to the ordinary charges for transportation, canal tolls were imposed upon all freight passing over it, to prevent the diversion of traffic from the canal, the railroad and canal being parallel for their whole length. In 1851 the Central line was relieved from the canal tolls, on the ground that it should be placed on as favorable footing as the Erie, which by its charter was exempted from them. In 1851 the Hudson River railroad was opened, and with it two lines of railroad from the harbor of New York to the lakes, neither of them being subject to any other burden than the cost of transportation. The total through tonnage of the only roads that could then compete with the canals—the Baltimore and Ohio not being opened until 1853, nor the Pennsylvania till 1854—was 78,134 tons; the through west tonnage of the two roads for the year was 46,601 tons, against a through tonnage on the canal from the Western states of 1,151,978 tons, or, including that from Buffalo of fully 1,300,000 tons, a total of about 2,450,000 tons; in other words, a quantity twenty-six times greater than that of the two railroads competing for its business.

In 1852 the Michigan Central and Michigan Southern roads were completed to Chicago. Since and including the year 1849, the average annual increase of railroads in the United States had been 1,728 miles. Up to 1849, the average annual increase in miles of road was 316.

From 1861 to 1864 railroad construction was virtually suspended, the total additions during that time being only 3,273 miles, of which 133 miles were in New England, 1,235 in the Middle states, 1,433 in the Western states, 143 in the Pacific states and 329 in the Southern states. In 1840 the rates of mileage of railroads to population was one mile of road to every 7,415 inhabitants; in 1850 it was one mile to every 3,298; in 1860 one mile to 1,083. In the gold-producing states the railroad system was slow to start its development. Till 1855 there were no railroads in the Pacific states. During eight years more there were less than thirty miles, and the cost of transportation was enormous.

From 1865 until 1873 the construction of new lines of railroad progressed with unusual vigor, due in a measure to the great abundance of capital, but primarily to the undertaking of the Pacific lines of railroad under the stimulus of government aid. In this period no less than 36,359 miles were added to the country's railway ramifications, being an increase of nearly 107 per cent. In other words, more railroads were built in these nine years than in the preceding 34 years.

The financial disasters of 1873 were followed by a long period of depression in all the industries of the country. Though in none was it more marked than in that of railway extension, yet such were the requirements of the country that in the five years, 1874 to 1879, there were added 16,316 miles of road, an annual average of 3,263 miles, against an average of 4,040 miles per annum during the nine years preceding.

In the following statement the progress of railroads in the two periods above referred to is clearly set forth:

STATES.	1864.	1873.	INCR'SR 1873.	1879.	INCR'SR 1879.
New England states...	3,793	5,314	1,521	5,903	589
Middle states	7,580	13,028	5,448	14,985	1,957
CentralNorthern states	10,570	20,174	9,604	24,004	3,830
South Atlantic states...	5,519	7,474	1,955	8,215	741
Gulf and Mississippi states	3,865	6,118	2,253	6,812	694
Southwestern states...	1,454	8,114	6,660	11,843	3,729
Northwestern states...	962	7,519	6,557	10,414	2,895
Pacific states	166	2,527	2,361	4,408	1,881
Total United States ..	33,909	70,268	36,359	86,584	16,316

From 1874 to 1888 there were built 85,901 miles of new railroad, an increase of over 122 per cent; that is, in these fifteen years there were built 15,633 miles of railroad more than were built in the preceding forty-five years. The first five of these fifteen comprised a period of depression, the next four years were years of unexampled activity, while the three years of 1883, 1884 and 1885 were years of hesitancy, in which

no new railroad enterprise of great magnitude was begun, as was natural, after the completion in a single year (1882) of nearly 11,600 miles of road. In 1886 there were added 8,018 miles and in 1887 12,878 miles, the latter surpassing the record of any previous year; and in 1888 6,912 miles. In the three years the new construction aggregated 27,808 miles, or within 351 miles of the extraordinary record of the three years from 1881 to 1883. In these two periods (1881-1883 and 1886-1888), covering only six years of national existence, 56,000 miles of railroad, being more than 30 per cent of the total in operation in 1895, was built at a cost, meaning a permanent investment, of \$1,750,000,000.

Since 1888 there has been a steady decline in railway construction, as shown in the appended tables, embracing all the United States.

YEARS.	MILES NEW RAILROAD BUILT.	TOTAL RAILROAD MILEAGE.
1881-----	9,778.85	103,143.00
1882-----	11,599.52	114,712.00
1883-----	6,818.72	121,455.00
1884-----	3,973.71	125,378.51
1885-----	3,131.14	128,360.78
1886-----	8,128.48	136,400.51
1887-----	12,983.62	149,256.76
1888-----	7,066.00	156,169.13
1889-----	5,695.67	161,352.82
1890-----	5,656.70	166,690.56
1891-----	4,620.41	170,762.43
1892-----	4,584.01	175,181.06
1893-----	2,789.02	177,457.96
1894-----	2,157.39	179,279.34
1895-----	-----	-----

PACIFIC RAILROADS. The completion of the Union Pacific Railroad on the 8th of May, 1869, and the opening of the first through transcontinental route formed thereby, has been deservedly classed as among the most potent factors in the extraordinary growth of the great West, as well as one of the strongest ties which has bound the rapidly growing communities of the Pacific slope with the people east of the Mississippi River.

Important as was this event, it was overshadowed by the completion, in 1883, of three other transcontinental routes in different sections of the country. While the year was yet in its infancy, the Southern Pacific and the Galveston, Harrisburg and San Antonio Railroads formed a junction at El Paso, Texas, and established a route running westwardly and northwestwardly from New Orleans through the states of Louisiana, Texas, New Mexico, Arizona and California to San Francisco.

The opening of the Northern Pacific railroad attracted widespread attention, not only on account of the elaboration of details attending it, but for being the completion of a stupendous enterprise. Chartered in 1864, it was not until 1869, when the Union Pacific had been completed, that construction was actually begun. In 1873 there were completed on the eastern end 450 miles of road from Duluth, Minnesota, west to Bismarck, Dakota, and on the western end 105 miles from New Tacoma, Washington, to Kalama.

The financial disasters of that year were more than the enterprise at that stage of its existence could withstand. It was sold, and reorganized; and when the financial storm had spent its force, in 1879, the Northern Pacific Railroad Company began anew the work of construction on the west bank of the Missouri River, opposite Bismarck; and several months later, on the western division of the line at the confluence of the Columbia and Snake rivers, in Washington Territory. The intervening gap between those points was 1,222 miles; and until complete success was achieved by the driving of the golden spike, on Sept. 8, 1883, the work progressed without serious interruption.

Following closely on the opening of the Northern Pacific came the announcement of the completion of the western division of the Atlantic and Pacific railroad to the Needles, on the Colorado River, where connection is made with the Southern Pacific railroad of California, and forming, in connection with that line and the Atchison, Topeka and Santa Fé, with which connection is made at Albuquerque, New Mexico, the fourth transcontinental route.

Besides these lines the other important extensions in the section of the country west of the Mississippi and east of the Rocky Mountains were by the St. Paul, Minneapolis and Manitoba, now the Great Northern system, which extended its line westward to Helena. The Chicago and North-Western was equally active in forwarding its western extension to Fort Casper, Wyoming, the Burlington in extending its line to Denver and more recently in a northwesterly direction to Merino, Wyoming, and the St. Paul in securing a line to Kansas City. All of these lines added considerably to their mileage in the way of branches, etc., and a vast number of important independent lines were also constructed. But the chief event of the period in that section of the country was the great battle of the powerful railroad corporations for territorial control. In the great struggle that ensued from the rivalry of the Atchison, Missouri Pacific, Rock Island, the Burlington and the Union Pacific companies, a far greater extent of mileage was added than under ordinary circumstances would have been constructed in a quarter of a century.

RAILS. The pattern of rail now in general use was designed by Mr. Robert L. Stevens, who was actively identified with the construction of the Camden and Amboy railroad in New Jersey, upon which line rails of this style were first laid. These rails were made in England, there being at that time no rolling-mill in the United States capable of manufacturing them.

"The rails," says a historian of that road, "are of rolled iron, 16 feet long, 2½ inches wide on the top, 3¼ inches at the bottom and 3½ inches deep; the neck ½ inch thick. The weight is 209 pounds, equal to 39¾ pounds per yard. They are secured by clamps of iron, riveted at the extremity of each bar. The rails are attached to the stone blocks and sleepers by means of nails or pins at the sides, driven into wooden plugs. Chairs are dispensed with." The use of the H or T rail spread rapidly

to all the chief roads of the United States. It became widely known as the Vignoles rather than the Stevens rail, because a European engineer, Mr. C. B. Vignoles, hastened its introduction on European railways, using them on English roads during the progress of construction to an extent that gave to them the title of contractors' rails.

In 1863 the first steel rail was laid in the tracks of an American railroad. Steel rails were then in use in Great Britain, to a very limited extent, however, but so enthusiastic in their praises were the railroad managers who had tried them that the Pennsylvania Railroad Company was induced to order a small lot with which to make experiments, and accordingly purchased one hundred tons of English steel rails, paying \$150 gold per ton, equivalent at that time to over \$300 in United States currency. These rails were made of crucible steel, and proved to contain such a large percentage of carbon that many of them broke during the following winter, which was unusually severe. The company was not discouraged by this unfortunate experience, but gave further orders for 500,000 ton lots, which were presumably made of softer metal. In 1864 imported steel rails sold at \$162.50 gold per ton, or about \$250 per ton currency, but later in the year they sold at \$135 gold. The Bessemer process of steel production was then in its infancy.

On May 24, 1865, the first Bessemer steel rail made in the United States was rolled by the North Chicago Rolling-Mill Company from steel made at Wyandotte, Michigan, this being an experimental rolling of but six rails. In 1867 some tons were also rolled in an experimental way by the Spuyten Duyvil (New York) Rolling-Mill from steel made at Troy, New York. In August, 1867, the Cambria Iron Company began to roll Bessemer steel rails in the way of regular business. Other companies soon followed in their wake, and from 1870 the Bessemer steel-rail manufacture assumed in the United States the position of an established branch of the iron and steel trades.

The following statement showing the mileage of iron rails and of steel rails in the total track-mileage of the United States is taken from Poor's Manual for 1896:

YEAR.	MILES STEEL RAILS.	MILES IRON RAILS.	TOTAL MILES.	PER CENT STEEL OF TOTAL.
1880.....	33,680	81,967	115,647	29.1
1881.....	49,063	81,473	130,536	37.5
1882.....	66,691	74,269	140,960	47.3
1883.....	78,491	70,692	149,183	52.7
1884.....	90,243	66,254	156,497	57.6
1885.....	98,102	62,495	160,597	61.0
1886.....	105,724	62,324	168,048	62.9
1887.....	125,459	59,588	185,047	67.7
1888.....	138,516	52,981	191,497	72.3
1889.....	151,723	50,513	202,236	75.0
1890.....	167,606	40,697	208,303	80.4
1891.....	174,931	39,756	214,687	81.5
1892.....	182,858	38,641	221,499	82.6
1893.....	191,857	37,155	229,012	83.8
1894.....	197,653	35,266	232,919	84.8
1895.....	206,546	28,652	235,198	87.8

LOCOMOTIVES. A great advance in railway traffic came from the introduction of Bessemer steel rails. It rendered possible an increased weight of locomotives and higher rate of speed, resulting in an enormous increase in the carrying capacity per train of the railroads and in more prompt and efficient service both for passenger and freight traffic. Nothing can be more striking than to contrast the present engine with that of 1826. The locomotives first constructed weighed only from three to six tons, and were hardly capable of drawing on a level road half the weight of the improved machine of to-day.

Originally the locomotives constructed in this country followed closely the model of the English imported engines, but these were found to be inadequate. The first improvement of importance was the swiveling truck, first suggested by Horatio Allen, but whose invention is accredited to John B. Jervis. This truck, placed under the front end of an engine, enables it to run around curves of almost any radius. As many of the first lines in the mountainous sections of the country were built with sharp curves in order to limit the cost of construction, this invention solved the problem of building an engine that might be successfully worked on them. The swiveling truck was first used on an engine on the Mohawk and Hudson railroad (New York) in 1831.

Another objection to engines of the English pattern was, that in running over rough or unevenly laid tracks these locomotives constantly ran off the tracks, and this led to the invention of the equalizing beams or levers (patented in 1838 by Joseph Harrison, Jr., of Philadelphia), by which the weight of the engine is always borne by three out of four or more driving-wheels.

It is recorded that one of the first locomotives built in this country, the "South Carolina," designed by Horatio Allen, had eight driving-wheels, but with few exceptions all the early locomotives had but four wheels.

In 1836 Henry P. Campbell of Philadelphia patented the use of two pairs of driving-wheels and a truck, the driving-wheels coupled by rods. So generally has this plan of construction been adopted in America that this description of engine became known as "The American type of locomotive."

The first "Mogul" engines were built in 1863; the first "Consolidation" engines about 1866. The tendency at all times was toward increased efficiency, which necessitated constant additions to the weight of the locomotive. The evolution of the locomotive from an engine weighing four to seven tons in the first years of railroad development to the seventy-ton machine of the present day, was gradual, though remarkably rapid, when it is considered that the whole fabric of the present almost perfect method of railroad transportation is the development of only seventy years.

The most radical departure of late years has been the use of compound locomotives, which has resulted in increased economy in fuel rather than

increased capacity of power and speed, and the highest speed-records are those which have been made by simple engines. The first successful compound locomotive built in the United States was designed and constructed by the Schenectady Locomotive Works. This was a heavy ten-wheel passenger engine for the Michigan Central railway, and it did excellent service.

One of the most noticeable changes since 1880 has been the increase of boiler-pressure from 130 or 140 pounds to 180 or 190 pounds, and many engines are now running with as much as 200 pounds pressure. The steam-pressures now used in locomotives are the same as carried in the latest steamship practice, where the steam is used in triple and quadruple expansion engines. Increase in boiler-pressure, by imparting greater velocity of steam, leads directly to higher speeds, as well as to increased economy in coal.

Driving-wheel weights have increased since 1880 from 12,000 or 14,000 pounds, which was then about the maximum figure, to the present figures of 20,000 to 23,000 pounds, and thus has had a most noticeable effect on the capacity of locomotives for power and speed. Light engines, of course, can make high speeds with small trains, but modern express service requires high speed with very heavy trains.

Considerable improvement in valve-motion has also been made, leading to reduced back-pressure and greater efficiency of steam; but it is noteworthy that these improvements are simply an improved design of the original Stevenson link-motion which has been used since locomotives were first built. The use of the compressed-air sand-blast has been of much value in producing greater adhesion of the driving-wheels on slippery rails. Much better protection is given to locomotive boilers now than formerly, resulting in increased economy of coal and greater capacity for power and speed.

Other noteworthy improvements consist in lightening all parts as much as strength will allow, in order to permit the use of the largest boiler. The capacity of a locomotive at high speeds is limited entirely by the power of the boiler to make steam, and as the maximum weight of the engine is limited by strength of rails and bridges, everything which tends to lessen dead weight and permit of large boilers has a direct effect in increasing the power and speed of locomotives. Cast-steel driving-wheels, for instance, are now largely used instead of cast iron; foot-plates are made of cast steel instead of cast iron, and in many other details cast steel and wrought steel have been substituted for iron with a considerable reduction of weight and increase of strength.

The increase in boiler capacity has led to the use of much higher locomotives than formerly; fire-boxes are now put on top of the frames, and even extended over the wheels, in order to allow the use of larger grates. Fears were at first entertained that engines having these high centers of gravity would not be as safe for high speeds as the lower engines. These fears, however, proved unfounded, and the high locomotives are seen to have a more gradual and easy motion than the lower ones, and we know of no case on record where the high center of gravity has led to accident.

In freight service the same line of development has taken place as in passenger, it having been proved that the cost per ton per mile is less by hauling the most cars per train; though this is modified by competition, which has led to higher speed of freight trains, so that on some roads the fast-freight service approaches the conditions of heavy passenger service, as far as locomotive requirements are concerned, and some engines are frequently used for both classes of work.

For mountain service slow speeds are used, and all effort is directed to hauling the heaviest possible train. This involves the use of the greatest wheel weights that the rail will stand, and the use of the consolidation or

decapod type of locomotives with four or five pairs of drivers coupled. For fast-freight service engines of the mogul or ten-wheel type, with 100,000 to 120,000 pounds on six drives, are used, and having as much as 70 tons total weight. For mountain service, consolidation or decapod engines are built, having 22-by-26 or 23-by-28 inch cylinders, with a total weight of from 80 to 100 tons, exclusive of tender.

PASSENGER-CARS. In early railroading there was little difference in appearance between the passenger-car and a freight caboose. Some attempts at ornamentation were made by a few of the companies, but these were modest enough, consisting simply of ornamental painting, scenes from life, more or less artistically executed, and very simple arrangements for comfort. In addition to improving the ventilation, candle-light was provided for night travelers, and in cold weather a stove in the corner furnished the heat which travelers had been wont to draw from each other or in small degree from the straw with which the car-floor had been strewn. As travel increased, however, and the need of better accommodations became apparent, the passenger-car was lengthened and its height increased; its ventilation was improved and conveniences of various kinds added. A great step forward was taken when provision was made for sleeping in a recumbent posture. A night car with rude sleeping-berths, such as are in use on steamboats, but furnished with no bedding, was the first form of sleeping-car which surprised and delighted the traveling public. It was introduced on the Cumberland Valley railroad, in Pennsylvania, so long ago as 1836, and in November, 1838, the Philadelphia, Wilmington and Baltimore put on a similar car.

In 1854 sleeping-cars having the same general features as those now in use were introduced. This car provided seats for about sixty passengers, and at night these seats were converted into flat berths. The inventor was Theodore T. Woodruff. The right to build and operate the car was later acquired by Webster Wagner.

Pullman sleeping-cars were introduced in 1864 or 1865. In 1867 a hotel-car, the first in use, was built by him for the Great Western railway of Canada, and in 1868 Wagner built the first two drawing-room cars ever run for pay. Various styles of special cars have since been built; as, the hotel car, the private car, the hunting-car, the observation-car, the library-car, the dining-car, the composite car, and the combination-baggage-dining-room-car—all worthy of mention. Buffets were introduced by the Pullman Company into parlor and sleeping cars in 1883. For supplying heat alone, improvements in processes to the number of several hundred have been patented. Heating by salt-water circulation once displaced the use of stoves; afterward, steam-heating was substituted; finally, successful experiments in heating cars by electricity have been recorded. In lighting passenger-cars several forms of compressed gas have been substituted for candles and oil-lamps. All first-class passenger and sleeping cars are now equipped for electric lighting, so that such illumination can be introduced at any time. Water

for toilet purposes is supplied on first-class cars, and on Pullman, Wagner and many private cars both hot and cold water are provided. The water is stored in tanks underneath the cars and forced by air-pressure into the basins. The air-pressure system was first put into use in February, 1888, by the Pullman Company, and is now in general use on their cars. It is applied to lavatories, closets, bathrooms, dining-rooms and barber-shop basins. Hot water or cold water may be drawn from the same faucet, according as it is turned in one direction or in the other.

For steadying the cars while in motion and preventing accidents, various devices have been adopted. One of the most important of recent improvements in palace-cars is the patent buffer at the end of each platform. This obviates the danger of getting the foot caught between the platforms, and also imparts a steady motion to the train. In case of a collision it effectually prevents the cars from telescoping; a security still further augmented by the vestibule connections originated by the Pullman Company in 1887. The first vestibuled train was built at Pullman, and put into service on the Pennsylvania railroad in April of that year.

This vestibule construction involves a solidly continuous system of combination bottom and top buffers, and heavy diaphragm frame-plates rigidly attached to the buffers, and which permit of the use of additional cushion springs at both top and bottom of the frame-plate buffers, thus distributing the impact in collision to the parts of the framework of the car best calculated to withstand the shocks. A vestibule train is perfectly sinuous, and is virtually under one continuous roof, with inclosed passages from car to car.

The Pullman anti-telescoping devices consist of heavy steel plates two feet wide, extending across the car and bolted to the bottom of the sills and between them and the platform timbers; also of heavy steel angle-bars back of the corner-posts or end framework of the car, strongly secured to the heavy steel plates. These angle-irons extend in a continuous bar upward and across the roof, and downward on the opposite side to the sills, thus reinforcing the end framework of the car with a hollow cylinder casement of great strength, which not only keeps the car-frame in proper shape, but prevents the end of the car from being broken in case of collision.

Since 1880 the length of passenger-cars, which was then from forty to fifty feet, has been greatly increased, so that now sixty feet is not an unusual length, and many recently built Pullman coaches are seventy feet in length over ends. The body-framing of cars, also, has been greatly improved; trucks are much heavier, with larger wheels; and brakes have been improved by the quick-action feature. Much attention has also been given to the improvement of springs; and comfortable high-back seats have been introduced, rendering riding far more comfortable than formerly. Great advances, too, have been made along the line of art-work, to conform to new styles adopted from time to time.

The government has already issued 3,000 patents for railroad brakes alone, 7,000 for railway draft appliances, 6,000 for railway rolling-stock, and 8,500 patents are classed under the head of railways. Four fifths of these patents have been issued since 1880, an evidence of immense inventive activity. During the year 1894, 684 patents were issued for improvements on cars and parts of cars, car-couplers alone receiving 218 patents. The railways and railway appliances received 562 patents in 1894, as against 735 for the year before.

FREIGHT-CARS. The introduction of steel rails led to the construction of heavier freight-cars, for

it was found that such rails would bear heavier loads without danger. By increasing the weight of the car from, say, 18,000 pounds to 21,000 pounds, its capacity was increased from 20,000 to 30,000. A further increase in weight to 22,000 or 24,000 makes it possible to carry a load of 40,000 or more. The loads can be increased in weight faster than the cars, and thus the "paying" weight constitutes a larger percentage of the total hauled. The normal freight-car in 1870 weighed 18,000 pounds and carried a load of 20,000. Freight-cars of to-day are from 34 to 40 feet in length, weigh from 29,000 to 36,000 pounds, and carry loads of from 60,000 to 70,000 pounds, the 60,000-pound car being now considered the standard. During the year 1895-96 coal and ore cars of 80,000 pounds capacity were added to the equipments of a few of the leading railroads.

The following table shows the relative increase since 1876 in dead weight of car, and paying load:

YEAR.	DEAD WEIGHT OF CAR.	WEIGHT OF PAYING LOAD.	TOTAL WEIGHT LOADED.	WEIGHT OF CAR, PERCENTAGE OF TOTAL.	PAYING LOAD, PERCENTAGE OF TOTAL.
	Lbs.	Lbs.	Lbs.	Per cent.	Per cent
1876-----	20,500	20,000	40,500	53.62	46.38
1882-----	24,000	40,000	64,000	37.50	62.50
1889-----	27,700	60,000	87,700	31.59	68.41
1895-----	36,000	80,000	116,000	31.04	68.96

The construction of wooden cars of a greater capacity than 70,000 or 80,000 pounds is not probable, because the increase which would be necessary in size and weight of the parts would increase the dead weight and decrease the paying load. Future development must come through the increased use of metals in car construction. Car-trucks now are made entirely of steel, and it is predicted that in the near future the entire bodies of freight-cars will be made of steel. Steel cars were built by the Carnegie Steel Company and put on exhibition at the convention of the Master Car-Builders' Association in 1896.

In variety, freight-cars are especially adapted to many uses. There are now ventilated refrigerator-cars for the transportation of fruits, vegetables, fresh meats and other perishable goods; cattle-cars with arrangements for watering and feeding stock while in transit; single and double deck cars for sheep and hogs; improved box-cars for general merchandise; special cars for furniture and other light-bulk freight; improved flat-cars for lumber and stone; double and single hopper-bottom cars for coal, crushed stone, etc., and special cars for ores, of which the heavier ones are often lined with iron plates. There are poultry-cars, in which birds are fed and watered. Other special cars are caboose-cars, horse-cars, coke cars, barrel-cars, as well as flat-cars from 60 to 70 feet in length, upon which street cars are shipped.

SAFETY APPLIANCES. In 1880 freight-cars were used with single brakes, and the brake-beams were of wood and in most cases not trussed. By an act of Congress, approved March 2, 1893, the companies engaged in interstate commerce are required to equip their cars with automatic couplers and brakes and other appliances for insuring safety to trainmen, and the companies

were allowed until Jan. 1, 1898, to comply with these requirements.

Improved brakes enable trains to make better time, to be quicker halted and thereby avoid accidents. Improved draw-bar and buffer attachments have also been applied, likewise additional grab-handles, steps and ladders for the protection of trainmen. All freight-cars now building, with few exceptions, are equipped with Master Car-Builders' vertical-plane automatic couplers, and the old link-and-pin draw-bar in general use in 1880 is rapidly being displaced.

One part of a car has not yet been treated fairly, and that is the wheel. The flange of the wheel is no larger than many years ago, and the weight of the wheel has been increased but little. The steel tire has gained largely in weight, and the wheel should be increased to at least 650 pounds, and 700 pounds would be still better.

While there are many different doors in use, there is none wholly satisfactory. The same applies to car-roofs. Also, there should be uniform type of draft-rigging. These three matters are of pressing importance, for it is the universal experience that the roof, the doors and the draft-rigging are the great items of expense in maintaining equipment.

The following table shows the equipment growth of American railroads from 1880 to 1895:

YEAR.	LOCOMOTIVE ENGINES.	REVENUE CARS.			TOTAL.
		Passenger.	Baggage, Mail and Express.	Freight.	
1880---	17,949	12,789	4,786	539,255	556,930
1885---	25,937	17,290	6,044	805,519	828,853
1890---	32,241	22,958	7,253	1,061,917	1,092,241
1895---	37,090	27,979	7,891	1,230,817	1,266,687

Since 1880 the number of locomotives has increased 106.64 per cent; of passenger-train cars 104.10 per cent, and of freight-train cars 128.25 per cent. In 1880 the ratio of passenger-cars to locomotives was as 98 to 100; in 1895 it was as 97 to 100. In 1880 there were 30.04 freight cars for each locomotive, and in 1895, 33.18. Since 1882, the year for which the statistics were first compiled, the average tonnage weight of a freight train, measured by the number of tons hauled per freight-train mile was 125.86 tons; in 1895 it had increased to 180.23 tons.

The average number of miles run per annum by each freight-car in service ranged from about 450 miles in 1883 to 408 in 1888, then increasing to about 450 in 1890, 1891 and 1892, followed by a further decline to less than 400 miles in 1894 and 1895. It is because of this unsatisfactory lack of uniformity in service derived from their freight equipment that the railroad companies are now carefully considering plans looking toward the adoption of some system of pooling freight-cars.

SPEED. Attention was first drawn to the possibility of materially lowering the time allowance on long runs by the performances of the train

which bore the Jarrett and Palmer theatrical troupe from New York to San Francisco in June, 1876. The run of 3,312 miles was made in just a quarter of an hour short of three and one half days, or at the rate of 40.18 miles per hour. At the present day this would be regarded as a creditable performance, but twenty years ago it was thought to be and was something phenomenal. This train also made the longest run without a stop which has ever been made—from New York to Pittsburg, 440 miles. It is also notable as having been hauled from Ogden to Oakland, 881 miles, by one engine, in charge of the same engineer for that entire distance.

In 1888 regular trains were run between New York and Philadelphia at the rate of 42 miles an hour by the Philadelphia and Reading railroad, and 43.6 miles an hour by the Pennsylvania railroad. In August, 1896, the regular run on the Pennsylvania line was made at the rate of 48.6 miles per hour, while a special train made the run, Sept. 18, 1895, at the rate of 53.88 miles per hour. Very fast time is also made by Philadelphia and Reading trains between the same points, one of those trains having broken the speed-record in November, 1892, by covering a mile in 37 seconds, and 5 miles in 3 minutes and 25 seconds, the speed for the mile being at the rate of 97.3 miles an hour, and for the 5 miles an average of 82.95 miles per hour. The first remarkable speed-run of which there is a record was made in April, 1885, by a train on the Panhandle road (Pittsburg, Cincinnati, Chicago and St. Louis railroad), which was run from Pittsburg to Denison, 93 miles, at the rate of 55 miles an hour, and from Denison to Newcomerstown, 14 miles, at the rate of 72 miles an hour. In 1886 this record was broken by the Pennsylvania fast express from New York to Chicago, which made a part of the run at the rate of 75 miles an hour, averaging for the whole distance 38.5 miles an hour. In the same year a special train on the New York Central, carrying Wm. H. Vanderbilt, made a run of 81 miles in 61 minutes. On Dec. 1, 1889, a special train of two officers' coaches carrying officials of the Atchison system ran from Bakersfield, California, to Lathrop, 220 miles, in 222 minutes. The shortest time consumed for a single mile was 45 seconds, and a stretch of 10.5 miles was run in 8 minutes, or at the rate of about a mile in 45.7 seconds. Another remarkably fast run was made Nov. 19, 1889, on the Union Pacific railroad, from Green River, Wyoming, to Ogden, Utah, a section where grades are very difficult and the curves sharp and numerous. The 76 miles were covered in 65 minutes.

In 1891 the New York Central railroad began to make records for speed, and has continued steadily to improve on its performances until at the present time that company's famous engine No. 999 has the world's record for sustained speed. In September, 1891, the run from New York to Buffalo was made at the rate of 59.5 miles an hour, the 436.32 miles being covered in 440 minutes. On Nov. 8, 1892, on the same

road the Empire State Express, consisting of four cars, pulled by engine No. 893, was run from Syracuse to Albany, 115.76 miles, in 110 minutes, an average velocity of 63.14 miles an hour. The section from Syracuse to Utica, 52 miles, was covered at a speed averaging 67.38 miles an hour. On May 9, 1893, engine 999 on the New York Central ran a mile in 35 seconds and again in 32 seconds; and on May 19, 1893, the same engine ran 5 miles in 3 minutes, or at the rate of 100 miles an hour. The run from Syracuse to East Buffalo, 146 miles, was made in 135 minutes actual running-time, or at the rate of about 65 miles an hour. During the Columbian Exposition the run from New York to Chicago over the New York Central and the Lake Shore and Michigan Southern roads was made regularly in 20 hours, or at the rate of 48.2 miles an hour. At the present time the regular run from New York to Buffalo is made at the rate of 50.7 miles an hour, while the run from New York to Chicago was made by engine 999, drawing a train over the New York Central and Lake Shore roads, on Oct. 24, 1895, at the rate of 64.8 miles per hour, a portion of the distance being covered at the rate of 92.3 miles an hour. This is the fastest time for such a long distance that has ever been made.

The Knickerbocker Express of the Cleveland, Cincinnati, Chicago and St. Louis railroad, on Jan. 27, 1895, was run from DeGraff, Ohio, to Bellefontaine, on an ascending grade, at the rate of 55 miles an hour. On the Chicago, Burlington and Quincy road a train of five mail-cars and one express-car is run from Chicago to Union Pacific Transfer, 498.9 miles, at the rate of 43.8 miles an hour, the run from Chicago to Galesburg, 163 miles, being made at the rate of 49.7 miles an hour, or 51.9 miles, deducting stops. On April 21, 1895, a locomotive and one car carrying newspapers was run from Camden to Atlantic City, New Jersey, over the Pennsylvania railroad line, at an average rate of 76.46 miles per hour, and 25 miles of the run, from Winslow to Absecon, was made at the rate of 83 miles an hour. It is claimed for the Baltimore and Potomac, another Pennsylvania railroad line, that on Aug. 3, 1895, a train was run from Landover to Anacostia, District of Columbia, 5.1 miles in 3 minutes, or at the rate of 102 miles per hour. For distances over one thousand miles the best time is made on the Southern Pacific. The "Sunset, Limited" train on that road runs from New Orleans to San Francisco twice a week, making the run of 2,489 miles at the rate of 32 miles an hour. Another very fast long-distance run is made by an Atchison, Topeka and Santa Fé flyer, which covers the 2,265 miles between Chicago and Los Angeles at the rate of 30.5 miles an hour, such a train being run every day.

These high rates of speed were made possible by the adoption of compound locomotives. These engines have double cylinders for high and for low pressure, and are the most highly developed type of locomotive thus far produced. They burn anthracite coal, which is smokeless. A speed of one hundred miles an hour is developed daily by such engines on the New York Central, Pennsylvania, Lake Shore, Philadelphia and Reading and other first-class roads. The speed is so furious the engineer dare not put his head out of the cab for fear of being blinded and suffocated.

In Great Britain efforts have been made to excel the speed attained on the New York Central road. A special train was run over the West Coast line from London to Aberdeen, a distance of 539.75 miles on Aug. 22-23, 1895, at an average speed of 63.24 miles per hour elapsed time, and 63.93 miles per hour running-time. The train weighed 150,080 pounds. Inspired by that effort, a special train on the New York Central, weighing 361,000

pounds, ran from New York to Buffalo at an average speed of 63.54 miles an hour elapsed time, and 64.22 miles an hour, time in motion. And as supplementing this feat, the same engine made the run from Buffalo to Chicago at the rate of 63.61 miles an hour, elapsed time, and 65.07 miles an hour, time in motion.

POOLING. In America the earliest railroad pools were developed in New England, but they were on a moderate scale and attracted little attention. The first pool having an important history was the Chicago-Omaha pool, established in 1870. This was followed in December, 1872, by the first anthracite-coal combination; the year following, the pooling agreement entered into between the railroad and steamship lines of the South went into effect; the "cattle eveners' pool" was organized in 1875, the Southwestern Railway Association in 1876, the Trunk Line Commission and Central Traffic Association in 1877. At the time of the passage of the Interstate Commerce Law most of the competing railroads of the country were banded together in one or another of a series of pooling associations.

Three forms of pooling have been practiced: anthracite-coal combinations, cattle and petroleum eveners' pools, and pools of general freight and passenger traffic. In the anthracite pool were the Philadelphia and Reading, Central of New Jersey, Delaware, Lackawanna and Western, Delaware and Hudson, Pennsylvania railroad and Pennsylvania Company. The chief objects in view were to maintain a remunerative price for anthracite coal, chiefly by restricting the output of that product, and to divide between the carriers the total amount of competitive traffic in accordance with agreed percentages. This agreement continued in force until August, 1876. On Jan. 1, 1878, a second combination went into effect, but it was dissolved at the close of the year, mainly because one of the parties to it refused to accept terms agreed upon by the others. During most of the years from 1878 to 1892 similar compacts were in force. The combination that attracted widest attention was the coal combination of 1892. In February of that year the Philadelphia and Reading leased the Lehigh Valley railroad and the Central Railroad of New Jersey, and made at the same time an agreement to buy the coal of their allied coal companies, the Lehigh Valley Coal Company and the Lehigh and Wilkesbarre Coal Company, and of the individual operators, at certain percentages of the prices that might be received for coal delivered at tide-water near New York. The plan covered practically the entire anthracite interest.

Suits were brought in Pennsylvania to annul the lease of the Lehigh Valley, and in New Jersey to annul the lease of the Central Railroad of New Jersey. In the latter case the chancellor of New Jersey decided against the lease in July, 1892, in consequence of which the road was surrendered to its owners in August. In Pennsylvania, on the other hand, the court, in December, 1892, decided in favor both of the lease of the Lehigh Valley and of the pooling agreement. In 1893 the contracts with the Lehigh and Wilkesbarre Coal Com-

pany and the Lehigh Valley lines were canceled, in obedience to orders of the New Jersey courts, and an order was issued by the chancellor perpetually enjoining those leases. Thus ended the celebrated coal combination of 1892.

The cattle eveners' pool was organized in 1875 to terminate a protracted struggle between the trunk lines from Chicago to Boston, New York, Philadelphia and Baltimore, which had frequently led to the transportation of live-stock at rates far below the actual cost. The plan involved an agreement between the rival companies to divide the traffic at a fixed percentage, and an engagement with an association of principal shippers to arrange their shipments so as to insure to each company its allotted share of the traffic. The shippers were, therefore, known as "eveners." In consideration of the services rendered by the eveners, they were allowed a rebate not only upon shipments made by themselves, but also upon all cattle shipped by other parties to other places east of Chicago. The scheme met with strenuous opposition, and was abandoned by the railroads in 1879. For petroleum the Standard Oil Company acted as evener under conditions similar to those described relating to live-stock traffic, and it received advantages in rates similar to those granted to the cattle eveners.

Other pools were devised to maintain rates on competitive traffic, in some cases by dividing the business between the railroads according to agreed percentages and in others by dividing the earnings from such business, the first method being known as a freight pool, the latter a "money" pool. The affairs of these pools were usually directed by a board consisting of a managing officer from each of the roads. There was also a commissioner appointed, whose duty it was to see to the enforcement of the agreement.

The earliest pool of this nature was made in 1870, between the Chicago and North-Western, the Chicago and Rock Island and the Chicago, Burlington and Quincy railroads, all three of which connected Chicago and Omaha. These railroads were of nearly equal length and financial resources, and their through business represented a large percentage of their total freight traffic, and produced an important share of their respective revenues. Accordingly, a pool was formed, and was continued without change for about fifteen years, when the expansion of these systems made new conditions. It passed through the Granger movement unshaken.

The competition in certain districts of the South had been even more reckless and ruinous than elsewhere. To avoid these evils, four railroads connecting Atlanta, Georgia, with the seaboard formed a pool in December, 1873; secured the co-operation of other lines, and established the Southern Railway and Steamship Association, affairs of which were directed by Albert Fink, vice-president of the Louisville and Nashville railroad. In three years this organization came to include practically all of the railroads south of the Potomac and Ohio rivers and east of the Mississippi,

together with a large number of connecting or competing steamship lines. The objects of the association were achieved by fixing rates, arranging a basis of classification, and especially by the establishment, in 1875, of a clearing-house to settle through-traffic accounts.

The Southwestern Railway Association, organized in September, 1876, embraced the Chicago and Alton, the Chicago, Burlington and Quincy, the Chicago and Rock Island, the Hannibal and St. Joseph, the Kansas City, St. Joseph and Council Bluffs, the Missouri Pacific and the Wabash lines. Before it was formed the roads extending from Chicago, St. Louis and other Mississippi River points to Kansas City, Leavenworth, Atchison and St. Joseph engaged in frequent struggles for competitive traffic, disregarding their published tariffs and giving special rates to the injury of the public and themselves. Large shippers had contracts at half-rates, and a few secured them at still lower figures. None but the unwary paid tariff rates. The remedy proposed contemplated that each road should obtain such a percentage of the business as it was fair to presume it could secure if agreed rates were maintained by all routes.

In July, 1877, the Trunk Line Commission and Central Traffic Association were formed, these being, in the extent of mileage covered, the most important pooling agreements entered into up to that time. For a long time heavy trunk-line traffic was relatively unimportant, because of the lower cost of shipment by water, but the improvements of roadway, engines and cars and the growth of return or west-bound traffic made it possible for the railroads to compete for through traffic, which resulted in wars of rates. These wars on a large scale began in 1869, when the Pennsylvania and the New York Central had obtained control of Chicago connections.

In July, 1874, the New York Central, the Pennsylvania and the Erie roads and their western connections entered into an agreement at Saratoga to maintain rates. But owing to the recklessness of the Grand Trunk of Canada and the refusal of the Baltimore and Ohio to enter the pool, an extensive railroad war broke out in the spring of 1875, and continued until late in the next year. During its continuance first-class rates were quoted at 25 cents per hundred, fourth-class at 16 cents, while actual rates went much lower. Exhausted by this destructive contest, the companies in July, 1877, entered into agreements for the division of west-bound traffic, and two years later included the more complicated east-bound traffic. These agreements proved insufficiently comprehensive, and were broken and modified several times until 1884.

Meanwhile, the existence of these agreements led to the formation of three new competing lines. In 1882 the Chesapeake and Ohio connections were completed, and the Delaware, Lackawanna and Western extended its line by lease to Buffalo; while on Jan. 1, 1884, the West Shore route was opened between New York and Buffalo. The

usual rate war was precipitated by the entrance of these new competitors into the field, and it was fiercer than the contests which had preceded it. It was terminated by an agreement signed by eight competitive trunk lines east of the Alleghanies, Nov. 6, 1885. This new agreement differed from the old ones in the assumption of responsibility by the trunk lines for their western connections, which the next year entered into a similar compact, thus forming the Central Traffic Association, with a passenger committee, for the maintenance of fares.

The Southern Freight Association, formed December, 1885, covered all freight for which two or more of the associated roads might compete, passing through all points on or west or south of a line through Buffalo, Salamanca, Pittsburgh, Wheeling, Parkersburg and Huntington. In the same month the railroads south of the Potomac and the Ohio and east of the Mississippi organized the Southern Passenger Committee to maintain suitable rates of fare.

On Dec. 19, 1885, in order to secure harmony and uniform rates, the Freight Traffic Association of the Middle States was formed. It comprised 37 railroads in the middle and more northern of the South Atlantic states, including all of the great trunk lines. Similar organizations for New England and the lines competing for traffic west of the Mississippi as far as the Pacific Coast were multiplied beyond convenient enumeration, when the Interstate Commerce Act was passed.

THE INTERSTATE COMMERCE LAW went into effect April 1, 1887. Many railroad companies now sought to maintain rates by such adjustment of tariffs as would, in effect, produce apportionment of traffic among competing lines, and agreements containing provisions to this effect were from time to time filed with the Interstate Commerce Commission.

But while protesting their willingness to obey the law, many of the railroads continued practices for the prevention of which the law had been framed.

On Jan. 8, 1891, representatives of the Western roads in control of the trans-Mississippi traffic organized the Western Traffic Association, to maintain rates through the distribution of competitive traffic according to agreed percentages. The ground to be covered included all state and interstate freight and passenger traffic, competitive between any two or more of the members of the association, having origin or destination in Illinois, Minnesota, Wisconsin, upper Michigan, or any state or territory west of the Mississippi River, except business to and from trans-Pacific ports, Texas, Arkansas, Mexico, and the Indian Territory. On Oct. 11, 1892, the association was dissolved because certain of its members took undue advantage of others. That the law was being violated before and during the continuance of this agreement, was a general belief, but it was difficult to obtain evidence upon which to found charges. However, the Interstate Commerce Commission brought suit against the Trans-Missouri Freight Association and the 18 railroads constituting it, under the anti-trust law of March 2, 1890. The decision in the first instance and also on appeal in October, 1893, affirmed the legality of the association. Encouraged by this decision, new combinations, virtually founded on pooling contracts, were made, as by the Central Traffic Association, the Western Freight

Association, the Southwestern Traffic Association, and the Trans-Missouri Association.

Meanwhile, public sentiment underwent a change as to evils of pooling. The law had not effected the good expected of it, but had really proven a failure from the outset. Complaints were heard that the system under it encouraged the discrimination between shippers, which the law was intended to prevent, and that it favored the restless and bargaining trader and the unscrupulous and reckless railway at the expense of the fair-minded shipper and honest railway official who aimed to comply with the provisions of the law. Measures to amend the law were brought forward in Congress, both in the Senate and in the House, the last proposal being in 1894, but no bill succeeded in passing both houses.

On Nov. 19, 1895, 31 leading railroad companies entered into an agreement that went into effect January, 1896, to co-operate with each other and adjacent transportation associations to maintain just rates, fares, rules and regulations on state and inter-state traffic, to prevent unjust discrimination and to secure reduction and concentration of agencies, and the introduction of economies in the conduct of the freight and passenger business. The association has jurisdiction over all competitive traffic (except coal, coke, iron-ore, mill-cinder, limestone and petroleum, and also all traffic destined to or coming from Florida, Georgia, North and South Carolina, Virginia and West Virginia, south of the south line of the Chesapeake and Ohio Railway) which passes to, from or through the western termini of the trunk lines, as now fixed or as they may be designed hereafter. On publication of this agreement suit was brought by the United States at the request of the Interstate Commerce Commission, praying for an injunction on the grounds that the agreement was in restraint of trade; an infraction of the anti-trust law of July, 1890, and contrary to the inter-state commerce law.

In March, 1896, representatives of railroad and steamship lines engaged in transcontinental traffic, formulated an agreement similar to that which existed up to Jan. 1, 1893, when the former transcontinental association was dissolved. It provides for a guarantee of \$870,000 yearly, to be divided in the ratio of 45 to 55 between the Pacific Mail Steamship Company and Panama Railroad Company, and is sustained by roads having Pacific terminals.

On April 1, 1896, the Southwestern Association was reorganized, and an agreement adopted for the pooling of all Texas traffic from the seaboard north and northwest.

ELECTRICITY AS A MOTOR. It is almost wholly since 1885 that attempts at applying the power of the electric current to the propulsion of railway cars have been made, and about five years later managers of street railways in general so far acknowledged the importance of the new form of traction as to give it a trial, and yet in a few years after animal traction was practically abandoned; the cable system is being rapidly superseded; steam dummy lines have gone the way of the horse road; the urban elevated railroads are pointing the same way, and even the standard railroads have been forced to adopt defensive measures against the encroachments and competition of the rapidly-expanding electric systems.

At first the trolley lines bid only for city and suburban passenger traffic, but in a short time they entered the field of inter-urban passenger traffic, with such success that they decided to compete for all local business. In pursuance of this policy they first secured contracts for carrying the United States mails; this was followed by making arrangements with the express companies for a share of that class of traffic, and now several of them have undertaken to compete for general freight business. The competition of electric with steam lines has made such inroads

into the earnings of the latter, that important companies, like the Pennsylvania, New York Central, and New York, New Haven and Hartford, have been forced to adopt it on certain of their branch lines, where it has given unqualified satisfaction.

Three methods of applying electricity are in use: the storage battery, the conduit system, and the widely-adopted overhead trolley. The trolley is only regarded as a makeshift, and the engineering problem of the day is the determination of a plan of electric propulsion for general use on railroads. Electric locomotives have been built, and others are under construction. Those in use on the Belt Line of the Baltimore and Ohio have developed enormous power, and maintained a rate of speed, so that locomotive-builders and manufacturers of electric motors have entered into compacts for the joint production of electric locomotives.

ELEVATED STREET RAILROADS were first introduced into New York City; and an account of them is given in Vol. XX, p. 240.

The elevated-railroad system has been put in successful operation, first at Coney Island, where a line one mile long has been in operation since June, 1881; then in Brooklyn, in which two systems operate over 28.41 miles of streets; and finally in Chicago, where three companies operate lines aggregating 47.94 miles. Two of these Chicago railways, with 39.38 miles of line, are operated with electric power.

The cost of the New York system to June 30, 1895, amounted to \$73,154,524, consisting of \$52,085,339 for cost of road, \$4,499,990 for equipment, \$2,155,195 for real estate and buildings, the remaining \$14,014,000 representing cost of leases. The cost per mile of road equaled \$2,024,198. The mile of road at Coney Island cost \$218,098. The Brooklyn system cost \$42,436,831, or at the rate of \$1,493,729 per mile. The two steam elevated railroads in operation in Chicago on June 30, 1895, together 14.94 miles long, cost \$33,907,783, an average of \$2,269,597 per mile. An electric elevated system, having 33 miles of line, was put in operation about June 1, 1895, the cost of which, as represented by its stock and bond issues, amounts to \$42,000,000 or \$1,272,727 per mile. The aggregate cost of elevated railroads in the United States is, therefore, \$181,717,235. The average cost per mile amounts to \$1,601,174 as compared with \$87,809 per mile for street railroads and \$54,844 per mile for standard steam railroads.

The system of elevated railroads has also been applied to trunk lines of railroad running through the business portions of populous cities, first in Philadelphia, then in Jersey City, and is now under consideration by the lines entering Chicago. Although the railroads oppose compulsory legislation on this point, it is admitted to be a great advantage to them in running their trains more rapidly and with less liability to serious accidents.

PUBLIC SERVICE OF RAILWAYS. In 1882 the number of passengers carried by railroads was 289,030,783; in 1895 the number was 543,974,263, an increase of nearly 90 per cent. In passenger movement, which means the total number of miles traveled by all passengers, the increase was from 7,483,059,934 in 1882 to 12,642,202,551 in 1895, an increase of about 70 per cent. It is a

fact worthy of note that in 1895 the number of passengers carried and the number of miles they traveled was nearly equaled in 1890, and was very largely exceeded in all the years between 1890 and 1895.

In 1882 the average receipts per passenger per mile amounted to 2.50 cents, the average receipts per passenger to 65.09 cents, the average receipts per passenger-train mile to 113.72 cents, and the average receipts per mile of railroad to \$1,964. In 1895 a considerable reduction is noticed, the average receipts per passenger per mile being 2.068 cents, the average receipts per passenger 48.10 cents, the average receipts per passenger-train mile 79.94 cents, the average receipts per mile of railroad being \$1,460.

In 1882 the number of tons of freight moved was 360,490,375; in 1895 the number was 763,799,883, the increase within that period being 111.88 per cent. In freight movement the increase was from 39,302,209,249 in 1882 to 88,567,770,801 in 1895, an increase of 49,265,561,552 in the aggregate, or 125.35 per cent. The highest recorded number of tons carried in any year was in 1895, but in 1890 the figures of the later year were very nearly equaled, while the movement was 2,000,000,000 greater.

In 1882 the average receipts per ton per mile amounted to 1.236 cents, the average receipts per ton to 134.75 cents, the average receipts per freight-train mile to 159.21 cents, the average receipts per mile of railroad to \$5,074. In 1895 the average receipts per ton per mile were 0.839 cents, the average receipts per ton 97.38 cents, the average receipts per freight-train mile 151.36 cents, and the average receipts per mile of railroad \$4,151.

CHARACTER OF TRAFFIC. Full and accurate returns of the classification of freight traffic for the years covered by this article are not available, but in the following statement will be found the percentages for the years 1890 and 1895:

DESCRIPTION.	1890.	1895.
	Per cent.	Per cent.
Products of agriculture.....	13.75	12.20
Products of animals	4.79	4.46
Products of mines.....	49.05	50.32
Products of the forest.....	8.75	8.05
Manufactures	14.25	12.95
Merchandise	4.32	6.04
Miscellaneous.....	5.09	5.08

No details of passenger traffic whatever are available, for the reason that the data has never been collated. For the same reason it is impossible to present any correct figures as to the cost and profits of either passenger or freight traffic, this information being called for by no board of railroad commissioners in this country, except that of New York state; and in order to comply with this requirement, the railroads have been compelled to estimate the cost of conducting passenger and freight business on the erroneous basis of an apportionment of gross expenses to each class of traffic according to their train-mileage.

RAILROADS IN THE UNITED STATES

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STATEMENT BY GROUPS OF FREIGHT CARRIED AND FREIGHT MOVEMENT OF THE RAILROADS OF THE UNITED STATES AT THE CLOSE OF THEIR FISCAL YEARS 1882 AND 1895.

GROUPS.	1882.		1895.	
	FREIGHT CARRIED.	FREIGHT MOVEMENT.	FREIGHT CARRIED.	FREIGHT MOVEMENT.
	Tons.	Miles.	Tons.	Miles.
New England states	28,605,416	1,680,009,065	42,183,249	3,374,290,496
Middle states	164,977,128	14,227,517,676	337,037,563	30,193,788,205
Central Northern states	112,994,545	15,518,010,669	223,734,762	28,714,735,510
South Atlantic states	11,150,122	1,152,261,588	45,800,646	6,216,071,981
Gulf and Mississippi Valley states	9,439,435	894,134,392	26,779,193	3,679,608,606
Southwestern states	13,828,827	2,113,863,778	43,655,714	7,285,185,949
Northwestern states	8,044,805	1,674,960,072	32,918,571	6,306,714,622
Pacific states	5,526,426	1,214,189,859	11,690,185	2,797,375,432

STATEMENT BY GROUPS OF FREIGHT EARNINGS, FREIGHT EARNINGS PER MILE, AND EARNINGS PER TON PER MILE OF THE RAILROADS OF THE UNITED STATES AT THE CLOSE OF THEIR FISCAL YEARS 1882 AND 1895.

GROUPS.	1882.			1895.		
	FREIGHT EARNINGS.	FREIGHT EARNINGS PER MILE.	EARNINGS PER TON PER MILE.	FREIGHT EARNINGS.	FREIGHT EARNINGS PER MILE.	EARNINGS PER TON PER MILE.
			Cents.			Cents.
New England states	\$ 28,577,481	\$4,616	1.70	\$ 41,725,803	\$5,453	1.24
Middle states	147,987,413	9,618	1.04	212,957,545	9,729	0.71
Central Northern states	159,148,556	4,649	1.03	214,422,454	3,990	0.74
South Atlantic states	19,775,267	2,424	1.71	49,054,174	2,400	0.79
Gulf and Mississippi Valley states	18,442,277	3,124	2.06	32,794,960	3,175	0.89
Southwestern states	40,742,313	2,918	1.93	90,416,124	2,848	1.24
Northwestern states	32,410,366	4,655	1.93	65,760,741	2,922	1.04
Pacific states	24,666,755	4,978	2.03	36,652,650	3,378	1.31

At the close of the tenth census year, 1880, the mileage and population of the eight geographical divisions of the country, with their relations to each other and to area, were as follows:

GROUPS.	POPULATION.	RAILROAD MILEAGE.	AREA, SQ. MILES.	POPULATION TO 1 MILE OF RAILROAD.	POPULATION TO SQ. MILE OF AREA.	AREA TO ONE MILE OF RAILROAD.
New England states	4,010,529	5,977	66,465	670.99	60.42	11.12
Middle states	11,756,053	15,181	116,530	774.39	100.88	7.67
Central Northern states	11,206,668	25,109	249,015	446.31	45.01	9.92
South Atlantic states	6,338,022	8,474	268,205	747.93	23.63	31.65
Gulf and Mississippi Valley states	6,525,097	6,995	230,230	932.82	27.04	32.91
Southwestern states	5,872,642	14,085	768,060	416.94	8.42	54.53
Northwestern states	3,052,915	12,347	609,315	247.25	5.01	49.35
Pacific states	1,393,857	5,128	717,060	271.81	1.94	139.83
United States	50,155,783	93,296	3,024,880	537.59	16.98	32.42

For the purpose of comparison a similar table, covering the statistics of 1895, is appended:

GROUPS.	POPULATION.	RAILROAD MILEAGE.	AREA, SQ. MILES.	POPULATION TO 1 MILE OF RAILROAD.	POPULATION TO SQ. MILE OF AREA.	AREA TO ONE MILE OF RAILROAD.
New England states	5,095,000	7,225	66,465	705.22	76.66	9.20
Middle states	15,660,000	21,705	116,530	721.50	134.39	5.37
Central Northern states	15,720,000	39,393	249,015	399.05	63.13	6.32
South Atlantic states	8,100,000	19,968	268,205	405.66	30.20	13.43
Gulf and Mississippi Valley states	8,110,000	14,442	230,230	561.55	35.23	15.94
Southwestern states	9,675,000	34,912	768,060	277.13	12.60	22.00
Northwestern states	5,600,000	29,465	609,315	190.09	9.19	20.68
Pacific states	2,625,000	13,911	717,060	188.70	3.66	51.55
United States	70,585,000	181,021	3,024,880	389.93	23.33	16.71

RAILROADS IN THE UNITED STATES

STATEMENT SHOWING NAME OF RAILROAD FIRST BUILT IN EACH STATE, TERMINI OF FIRST SECTION OPENED, LENGTH, DATE OPENED, AND TOTAL MILES OF RAILROAD IN EACH STATE
IN 1880, 1890 AND 1895.

STATE.	NAME OF RAILROAD FIRST BUILT IN STATE.	TERMINI OF FIRST SECTION OPENED.		LENGTH OF PORTION IN STATE.	DATE OPENED.	TOTAL MILES, 1880.	TOTAL MILES, 1890.	TOTAL MILES, 1895.
		From	To					
				Miles.				
Maine -----	Bangor and Piscataquis R. R. and Canal -----	Bangor -----	Oldtown -----	11.00	1836	1,005	1,377.47	1,704.71
N. Hampshire. -----	Nashua and Lowell -----	Nashua -----	Mass. State Line. -----	6.22	1838	1,015	1,142.25	1,178.44
Vermont -----	Vermont Central -----	White River -----	Bethel -----	25.00	1848	914	991.42	974.99
Massachusetts -----	Granite (not incorporated) -----	Quincy -----	Neponset River -----	3.00	1827	-----	-----	-----
Massachusetts -----	Boston and Lowell -----	Boston -----	Lowell -----	26.76	1835	1,915	2,056.69	2,126.05
Rhode Island -----	New York, Providence and Boston -----	Providence -----	Stonington -----	50.00	1837	210	217.43	226.37
Connecticut -----	-----	-----	-----	-----	-----	923	1,006.64	1,014.09
New York -----	Mohawk and Hudson -----	Albany -----	Schenectady -----	12.50	1831	5,991	7,745.85	8,205.26
New Jersey -----	Camden and Amboy -----	Bordentown -----	Hightstown -----	14.00	1832	1,684	2,099.86	2,208.07
Pennsylvania -----	Mauch Chunk & Summit Hill -----	Mauch Chunk -----	Summit Hill -----	9.00	1827	6,191	8,652.36	9,661.54
Delaware -----	Newcastle and Frenchtown -----	Newcastle -----	Frenchtown -----	16.19	1832	275	314.95	315.44
Maryland -----	Baltimore and Ohio -----	Baltimore -----	Ellicott's Mills -----	15.00	1830	1,019	1,270.04	1,291.54
Dist. of Col'bia -----	Washington Branch R. R. -----	Relay House, Md. -----	Washington, D. C. -----	4.00	1835	21	20.66	22.88
Ohio -----	Mad River and Lake Erie -----	Sandusky -----	Green Spring -----	22.50	1835	5,792	7,980.49	8,699.12
Michigan -----	Erie and Kalamazoo -----	Toledo, O -----	Adrian, Mich -----	33.00	1836	3,938	7,108.48	7,561.89
Indiana -----	Madison and Indianapolis -----	Madison -----	Vernon -----	22.00	1842	4,373	6,109.19	6,416.03
Illinois -----	Northern Cross -----	Jacksonville -----	Meredosia -----	24.00	1839	7,851	10,115.90	10,610.59
Wisconsin -----	Milwaukee and Waukesha -----	Milwaukee -----	Waukesha -----	21.50	1851	3,155	5,612.62	6,105.89
Virginia -----	Chesterfield -----	Richmond -----	Chesterfield Mines -----	13.00	1831	1,893	3,359.65	3,603.38
West Virginia -----	Baltimore and Ohio -----	Harper's Ferry -----	Opposite Hancock -----	39.00	1842	691	1,433.30	2,075.16
North Carolina -----	Petersburg -----	Petersburg, Va -----	Blakely, N. C. -----	63.00	1833	1,486	3,128.17	3,397.45
South Carolina -----	South Carolina Canal & R.R. -----	Charleston -----	West -----	7.00	1830	1,427	2,289.15	2,622.55
Georgia -----	Central -----	Savannah -----	West -----	9.00	1837	2,459	4,600.80	5,210.04
Florida -----	St. Joseph and Iola -----	St. Joseph -----	Lake Wimico -----	8.00	1836	518	2,489.52	3,095.05
Alabama -----	Tuscumbia and Decatur -----	Tuscumbia -----	Decatur -----	45.50	1834	1,843	3,422.20	3,664.45
Mississippi -----	Vicksburg and Jackson -----	Vicksburg -----	Jackson -----	14.00	1841	1,127	2,470.85	2,497.78
Tennessee -----	Nashville and Chattanooga -----	Nashville -----	Murfreesboro -----	30.00	1851	1,843	2,767.38	3,116.54
Kentucky -----	Lexington and Ohio -----	Lexington -----	Frankfort -----	29.00	1835	1,530	2,942.38	3,056.28
Louisiana -----	Lake Ponchartrain -----	New Orleans -----	L. Ponchartrain -----	5.00	1831	652	1,739.85	2,107.08
Missouri -----	Pacific -----	St. Louis -----	West -----	6.00	1852	3,965	6,142.02	6,571.58
Arkansas -----	Memphis and Little Rock -----	Memphis -----	West -----	5.00	1857	859	2,203.44	2,439.20
Texas -----	Buffalo Bayou, Brazos and Colorado -----	Harrisburg -----	Richmond -----	32.00	1854	3,244	8,709.85	9,434.12
Kansas -----	Union Pacific—Eastern Div. -----	Kansas City -----	Lawrence -----	40.00	1864	3,400	8,892.11	8,875.25
Colorado -----	Kansas Pacific -----	Sheridan, Kan -----	Kit Carson -----	87.00	1870	1,750	4,291.11	4,503.19
New Mexico -----	New Mexico & South Pacific -----	Colo. State Line -----	South -----	8.30	1878	758	1,388.77	1,505.03
Indian Ter -----	Atlantic and Pacific -----	Seneca -----	Vinita -----	35.50	1870	289	954.84	1,152.50
Oklahoma -----	Atchison, Topeka & Santa Fe -----	Ark. City, Kan -----	Ponca -----	25.00	1886	-----	305.81	431.17
Iowa -----	Mississippi and Missouri -----	Davenport -----	Muscatine -----	39.00	1855	5,400	8,416.13	8,523.13
Minnesota -----	St. Paul and Pacific -----	St. Paul -----	St. Anthony -----	10.00	1862	3,151	5,545.35	6,057.67
Nebraska -----	Union Pacific -----	Omaha -----	West -----	40.00	1864	1,953	5,407.47	5,542.27
North Dakota -----	Northern Pacific -----	Fargo -----	Bismarck -----	196.50	1873	1,225	2,116.49	2,534.71
South Dakota -----	Dakota and Northwestern -----	Big Sioux River -----	Yankton -----	60.00	1873	-----	2,610.41	2,800.80
Wyoming -----	Denver Pacific -----	Denver, Col -----	Cheyenne -----	106.00	1870	512	1,002.93	1,177.93
Montana -----	Utah and Northern -----	Ogden, Utah -----	Blackfoot -----	160.00	1869	106	2,195.58	2,828.55
California -----	Sacramento Valley -----	Sacramento -----	Folsom -----	22.50	1856	2,195	4,328.03	4,757.55
Washington -----	Dalles and Des Chutes -----	Lower Cascade -----	Upper Cascade -----	6.00	1862	289	2,012.05	2,820.05
Oregon -----	Oregon and California -----	Portland -----	Albany -----	80.00	1870	508	1,439.97	1,513.66
Nevada -----	Central Pacific -----	Truckee, Cal -----	Reno -----	35.00	1868	739	923.18	915.62
Arizona -----	Southern Pacific of Arizona -----	Yuma -----	Adonde -----	30.00	1879	349	1,094.81	1,412.20
Utah -----	Union Pacific -----	Evanston, Wyo -----	Echo -----	36.00	1869	842	1,265.49	1,404.29
Idaho -----	Utah Northern -----	Brigham, Utah -----	Franklin -----	61.00	1874	206	946.11	1,087.79

Massachusetts. The first railroad built in Massachusetts was the Granite Branch, but the first regularly incorporated road was the Boston and Lowell.

Connecticut. The New York, Providence and Boston was the first railroad opened in Connecticut, as it was also the first in Rhode Island. It was opened Nov. 10, 1837. The Hartford and New Haven, begun in 1836 from Hartford to New Haven, and about one half of the line (18 miles), was opened in 1838, the whole 36.25 miles being opened in 1839.

RAILROADS IN THE UNITED STATES

2503

STATEMENT SHOWING NAME OF RAILROAD FIRST BUILT IN EACH GROUP, TERMINI OF FIRST SECTION OPENED, LENGTH, DATE OPENED, AND TOTAL MILES OF RAILROAD IN EACH GROUP IN 1880, 1890 and 1895.

GROUP.	NAME OF RAILROAD FIRST BUILT IN GROUP.	TERMINI OF FIRST SECTION OPENED.		LENGTH.	DATE OPENED.	TOTAL MILES, 1880.	TOTAL MILES, 1890.	TOTAL MILES, 1895.
		From	To					
New England..	Granite (not incorporated)	Quincy, Mass.	Neponset Riv., Mass.	3.00	1827	5,977	6,831.90	7,224.65
Middle Atlantic	Mauch Ch'k & Summit Hill	Mauch Ch'k, Pa.	Summit Hill, Pa.	9.00	1827	15,181	20,103.72	21,704.73
Cent. Northern	Erie & Kalamazoo	Toledo, O.	Adrian, Mich.	33.00	1836	25,109	36,926.68	39,393.52
South Atlantic	S. Carolina Canal & R. R.	Charleston, S.C.	West	7.00	1830	8,474	17,300.59	19,967.63
Gulf & Miss. Val.	Lake Pontchartrain	N. Orleans, La.	L. Ponchartrain, La.	5.00	1831	6,995	13,342.66	14,442.13
Southwestern	Pacific	St. Louis, Mo.	West	6.00	1852	14,085	32,887.95	34,912.04
Northwestern	Mississippi & Missouri	Davenport, Ia.	Muscataine, Ia.	39.00	1855	12,347	27,294.36	29,465.06
Pacific	Sacramento Valley	Sacram'to, Cal.	Folsom, Cal.	22.50	1856	5,128	12,009.64	13,911.16
United States						93,296	166,697.50	181,020.92

STATEMENT SHOWING FOR ALL THE RAILROADS IN THE UNITED STATES THEIR MILEAGE, CAPITALIZATION, EARNINGS, EXPENSES, INCOME, ETC., AT THE CLOSE OF THEIR RESPECTIVE FISCAL YEARS ENDING IN 1880 AND 1895, WITH THE INCREASE AND RATE OF INCREASE WITHIN THE 15-YEAR PERIOD.

	1880.	1895.	INCREASE.	RATE INCREASE.
Miles of railroad owned	92,147	179,887	87,740	Per Cent. 95.21
Capital stock	\$2,708,673,375	\$5,231,373,552	\$2,522,700,477	93.13
Bonded debt	2,530,874,943	5,712,052,517	3,181,177,574	125.69
Other debt	162,489,939	419,558,711	257,068,772	170.51
Total	\$5,402,038,257	\$11,362,985,080	\$5,960,946,823	\$110.35
Miles of railroad operated.	82,146	179,228	97,082	118.18
Earnings from freight	\$464,748,928	\$743,784,451	\$279,035,523	60.04
Earnings from passengers	146,153,003	261,640,598	115,487,595	72.17
Miscellaneous earnings	2,831,679	99,859,218	97,027,539	*3,426.52
Total gross earnings	\$613,733,610	\$1,105,284,267	\$491,550,657	80.09
Operating expenses	358,176,055	777,778,551	419,602,496	117.15
Net earnings	\$255,557,555	\$327,505,716	\$71,948,161	28.15
Interest on bonds	107,866,328	242,943,243	135,076,915	125.23
Dividends paid	77,115,371	83,175,774	6,060,403	7.86

* The extraordinary increase in miscellaneous earnings is due to elevated railroads being brought into operation during the period.

STATEMENT SHOWING THE GROSS AND NET EARNINGS AND INTEREST AND DIVIDENDS PAID BY ALL THE RAILROAD COMPANIES OF THE UNITED STATES FOR THEIR RESPECTIVE FISCAL YEARS FROM 1880 TO 1895, BOTH INCLUSIVE.

YEARS.	GROSS EARNINGS.	NET EARNINGS.	INTEREST PAID.		DIVIDENDS PAID.	
			Per Cent.	Amount.	Per Cent.	Amount.
1880	\$ 613,733,610	\$255,557,555	4.26	\$107,866,328	2.85	\$ 77,115,371
1881	701,780,982	272,406,787	4.47	128,587,302	2.94	93,344,190
1882	770,209,889	280,316,696	4.77	154,295,380	2.91	102,031,434
1883	823,772,924	298,367,285	4.95	173,139,064	2.75	102,052,548
1884	777,396,317	270,890,951	4.66	178,058,382	2.48	94,414,835
1885	772,968,833	269,493,931	4.77	187,426,035	2.02	77,672,105
1886	829,940,836	300,603,564	4.75	189,036,304	2.04	81,654,138
1887	940,150,702	334,989,119	4.71	203,790,352	2.18	91,573,458
1888	960,256,270	301,631,051	4.35	207,124,288	1.77	80,243,041
1889	1,002,926,059	322,122,721	4.40	218,974,214	1.81	81,262,523
1890	1,097,847,428	346,921,318	4.27	226,799,682	1.80	85,075,705
1891	1,138,024,459	356,209,880	4.25	231,259,810	1.85	90,719,757
1892	1,204,915,204	358,638,520	4.25	232,659,089	1.93	95,662,412
1893	1,222,618,290	364,591,109	4.30	239,616,284	1.86	95,337,681
1894	1,080,305,015	322,539,276	4.11	237,620,367	1.64	85,278,669
1895	1,105,284,267	327,505,716	4.25	242,943,243	1.59	83,175,774

FINANCIERING. During the period from 1880 to 1884 there was an immense and unwarranted inflation in capitalization of lines of railroad. In the six years, 1879 to 1884, inclusive, there were listed on the New York Stock Exchange stocks and bonds of railroads aggregating \$3,361,017,293, as follows:

In 1879-----	\$698,074,074
In 1880-----	600,270,885
In 1881-----	763,880,151
In 1882-----	411,029,325
In 1883-----	617,507,884
In 1884-----	270,254,974
Total -----	\$3,361,017,293

This statement shows the vast magnitude of the operations of the country in railways in the period from 1880 to 1884. A portion of these listings were the stocks and bonds of reorganized companies, such as Erie, Wabash and others, and were so far relistings under new names and forms.

That vast amounts of fictitious capital were floated during this period is well known and universally acknowledged. Its effect was to precipitate the panic of 1884, in reference to which Poor's Manual for 1885 says:

"Of the 40,000 miles of line built in the five years ending with 1883, no small part was built on speculation, and for that very reason, paralleled already existing lines. The most striking examples of the kind . . . are the West Shore and 'Nickel-Plate' lines. The general demoralization which has prevailed in railroad circles is due more to the construction of these two and to the ill-fortune which attended them than to any other cause, or it may be said, to all other causes. The effect has been to stop altogether the payment of dividends, which had been paid for a long time at high rates, by the Lake Shore and Michigan Central, and to reduce those paid on the New York Central from two per cent quarterly to one-half one per cent quarterly. The stoppage or reduction of dividends on these great lines created profound apprehension and distrust as to the value of all railroad properties. The earnings of other great trunk lines suffered in like manner if not to the same extent. A general disruption of the relations previously existing between the companies was the inevitable result. They seemed to be set wholly adrift without chart or compass. In the distrust and incoherency which prevailed, the various lines, especially the great trunk lines, struck out on their own account and bid wildly for business with very little reference to rates or to the result. Pools were dissolved almost as soon as they were entered into, as they always will be dissolved whenever there is not enough business to go round."

"Although West Shore and 'Nickel-Plate' seemed to be the occasion of the great catastrophe of 1883 and 1884, the real causes had been long at work in the wonderful success of signal instances of 'watering.' The real catastrophe occurred when these waterings took place. Incited by their success, our whole people became wild upon the subject of railroad construction, believing that two or three dollars could easily be made for every dollar put up, either by the success of their ventures or by the sale of their securities. In this mania or delusion the capitalist and adventurer alike shared. The promoters of West Shore, men of capital, put up their money in good earnest under the idea that they were embarking in an honorable and meritorious enterprise. The promoters of 'Nickel-Plate' built their line on speculation and for the purpose of selling it, securities being issued at the rate of two or three dollars for every dollar of cash paid. No small portion of the 40,000 miles constructed in the five years ending with 1883 was built upon the same plan and with the same object. Whatever their fate, a large number of them became competitors for a

business for which ample provision had already been made by existing lines. Railroads, unfortunately, seem to reverse the rule of 'the survival of the fittest' to 'the survival of the unfittest.' They can be used but for one purpose, and when they go into the hands of receivers they are to be run so long as the operating expenses can be paid. If the earnings are not sufficient for this purpose they are to be eked out by 'receiver's certificates.'"

The extent of "water" in the share capital of the railroads is hard to determine. Of the total share capital, \$5,231,373,852, more than \$1,250,000,000 is duplicated. The duplication arises in this way: The capital stock of the St. Louis, Iron Mountain and Southern Railroad Company amounts to \$25,763,950, but this is owned by the Missouri Pacific Railroad Company, which in 1881 issued its own stock in the proportion of three shares for four in exchange for the Iron Mountain stock and carries the latter among its treasury assets. But as each company is still a separate corporation the capital of each is included in the summaries each year and there is in consequence a duplication to the extent of the increase in Missouri Pacific stock.

The elimination of this duplicated share capital would leave the "live" stock outstanding say \$4,000,000,000, of which about \$750,000,000 is preferred and \$3,250,000,000 common stock.

In almost a corresponding manner there have arisen duplications in the funded debts of the railroad companies through the issuance of collateral trust bonds secured by a deposit of bonds of subsidiary roads as security for bonds of the parent organization. In such cases each issue of bonds appears in the balance-sheets of the respective companies as liabilities, and are in consequence included in the general summaries of all the roads.

Estimating the aggregate amount of collateral trust bonds in existence and other bonds in the companies' treasuries at \$7,000,000,000, the net bonded debt of all the roads would be reduced to say \$5,000,000,000.

With these changes the capitalization of the railroads may be summarized as follows:

Capital stock, common-----	\$3,250,000,000	
Capital stock, preferred-----	750,000,000	\$4,000,000,000
Bonded debt, mortgage bonds--	4,300,000,000	
Incomes and other-----	700,000,000	5,000,000,000

Total stock and bonds, less duplications.. \$9,000,000,000

Of the common stock, vast sums have only a nominal value, such as the stock of the West Shore Railroad Company. How much of the remainder was issued without cash consideration it is impossible to ascertain, but it is within the bounds of safety to say that of the \$3,250,000,000 stock now outstanding not more than \$1,250,000,000 is full paid stock. This item of so-called "watered" stock is the rock upon which the railroad interest of this country has frequently struck.

In 1896, 63.6 per cent of the stock failed to pay any dividends, the dividends paid on the remaining 36.4 per cent averaging only 1.83 per cent on the whole amount of stock, and 5.04 per cent on the stock earning those dividends.

COMPARATIVE STATEMENT showing the amounts of capital stock upon which dividends were paid in 1882, and from 1886 to 1895 inclusive; the amounts upon which no dividends were paid; the relative percentages of such amounts, and the percentage of dividend payments to all stock and to that on which they were paid; also the amount of bonds on which interest was paid or charged against revenue during the same period, the "unproductive bonds" representing the amount of income bonds and bonds of a similar character on which no interest was paid; and those of new lines under construction at the close of each fiscal year, etc., etc.:

UNITED STATES.	CAPITAL STOCK.			PER CENT.		DIVIDENDS.		BONDED DEBT.			PER CENT.		INTEREST.		
	Productive.	Non-Productive.	Total.	Productive Stock.	Non-Productive.	Dividends Paid.	Per Cent. Total Stock.	Amount on which Interest was Paid or Charged.	Amount of Non-Productive Bonds.	Total.	Productive Bonds.	Non-Productive.	Interest Paid.	Total Bds.	Productive.
1882	1,673,790,859	1,805,170,387	3,478,961,246	48.11	51.89	101,967,560	2.93	2,770,707,249	419,707,952	3,190,415,201	86.84	13.16	150,232,255	4.71	5.42
1886	1,675,666,744	2,325,694,754	4,001,361,498	41.88	58.12	81,654,138	2.04	3,460,702,252	422,700,078	3,883,402,330	89.12	10.88	189,036,304	4.52	5.08
1887	1,805,487,881	2,386,074,148	4,191,562,029	43.07	56.93	91,573,458	2.18	3,624,051,895	562,891,421	4,186,943,316	86.56	13.44	203,790,352	4.67	5.39
1888	1,769,773,189	2,668,638,153	4,438,411,342	39.87	60.13	80,243,041	1.81	4,544,124,501,052	499,533,971	5,043,655,023	89.20	10.80	207,124,288	4.30	4.83
1889	1,790,842,473	2,704,256,845	4,495,099,318	39.84	60.16	81,262,523	1.81	4,544,218,312,205	610,053,506	5,154,271,718	87.37	12.63	218,974,214	4.35	4.98
1890	1,688,076,918	2,052,162,600	3,740,239,518	36.38	63.62	85,075,705	1.83	4,628,133,541	477,768,484	5,105,902,025	90.64	9.36	226,799,682	4.31	4.76
1891	2,046,060,711	2,763,115,940	4,809,176,651	42.54	57.46	90,719,757	1.89	4,434,721,057,192	514,237,882	4,948,965,079	90.18	9.82	231,259,810	4.30	4.77
1892	2,174,713,218	2,745,836,967	4,920,550,185	44.20	55.80	95,662,412	1.94	4,404,963,062,900	506,548,298	4,911,511,204	90.84	9.16	232,659,089	4.25	4.90
1893	1,995,402,886	2,084,630,318	4,079,033,204	39.38	60.62	95,337,681	1.88	4,845,124,056,309	446,236,115	5,291,292,424	91.90	8.10	240,538,207	4.32	4.69
1894	1,777,363,667	2,298,265,403	4,075,629,070	33.02	66.98	85,278,666	1.66	4,805,028,849,447	636,884,802	5,441,913,651	88.76	11.24	237,731,567	4.20	4.73
1895	1,818,819,436	3,412,554,416	5,231,373,852	34.77	65.23	83,175,774	1.59	4,575,260,903,441	451,149,076	5,026,410,517	98.10	1.90	242,943,243	4.25	4.61

See also INTERSTATE COMMERCE LAWS and PACIFIC RAILROADS, in these Supplements, and RAILWAY, Vol. XX, pp. 253, 254. JOHN P. MEANY.

RAILWAYS, ELECTRIC STREET. There are two general methods of using electricity for the propulsion of street cars:

1. The direct method, by conductors extending from the dynamo along the track.
2. The indirect method, by the use of storage batteries, secondary batteries, or accumulators.

In the direct method the conductors may be overhead, underground, or on the surface.

In the conduit system the conductors are placed in a conduit between the rails or between the racks. The wires must be bare and yet must be thoroughly insulated from the ground, a condition very difficult to obtain under such circumstances. A slot about five-eighths of an inch wide gives access to the conductors by means of a contact plow, but unfortunately also permits the flow of water, slush, mud, etc., into the conduit.

The overhead wire is suspended from poles by brackets or from cross-wires which span the street between poles on either side. When the street is of sufficient width, poles are placed in the center of the street between the two tracks, with bracket-arms carrying the conducting-wires. These poles are placed about 125 feet apart, and from actual experience are found to present little or no obstruction to traffic. The wires may be single or double. When single wire is used, the rails are utilized for the return current. When two wires are used, one wire carries the outgoing and one the return current. Contact is obtained with the wire by an over-running or an under-running trolley. The over-running trolley is a light carriage with one or more wheels resting on the wire.

A flexible conductor carries the current down to the car. The trolley is pulled along by the flexible conductor. The objections to the over-running trolley are, that it is difficult to keep the trolley on the wire, it is difficult to replace the trolley when it comes off, and any automatic system of switching on to a turnout, branch or Y is impossible. The

latter is such a serious objection that except in special cases the over-running trolley will never be used. In the under-running trolley a light arm of the requisite length is mounted on the top of the car, reaching up to the wire. A wheel on the end of the arm is pressed up against the wire by means of springs at the other end, and the current is carried from the wheel down through the arm itself if made of metal, or through wires if the arm is made of wood. This arm is usually called the contact-bar. The under-running trolley is automatic in its action at curves, turnouts, etc., and follows the direction of the car. It turns on a swivel through the entire circle, and moves through an arc of 90° in a vertical direction. (See TROLLEY ROADS, in these Supplements.)

In the storage system, a battery of about 120 cells is carried on the car, and the motors are driven by the current from this battery. The advantages of this system are: The cars can run on any track; no wires, either overhead or underground, are required; each car is more independent than is the case in other systems.

The disadvantages are:

1. The extra weight of about two tons on each car; the power required to carry this dead weight in addition to that required to drive cars required by the other methods.

2. The lack of efficiency in the batteries. The highest efficiency claimed is 82 per cent. The actual practical efficiency is stated by many authorities as about 70 per cent.

3. Storage cars cannot be regularly operated on grades exceeding five per cent or six per cent. The power required on grades makes too great a demand on the batteries.

4. The expense. The cost of two sets of batteries per car is about \$3,000.

5. The cost of maintenance. Batteries have not yet been made of sufficient durability to be operated economically. (See under *Secondary Cells*, ELECTRICITY, §109, in these Supplements.)

EFFICIENCY. The steam-engine is not an efficient machine. If we can utilize 15 per cent of the units of energy stored in the coal, we are fortunate. In

other words, we must expect a loss of 85 per cent of the heat-units in converting the other 15 per cent into mechanical power.

The dynamo electric machine, on the other hand, possesses a high degree of efficiency. No good generator runs below 92 per cent efficiency. The loss in the line depends upon the amount of copper used in proportion to the current to be carried. The size of the conductor is generally calculated for a loss of 10 per cent. The efficiency of the motor under favorable circumstances has been shown to be but little below the generator, in actual tests running as high as 91½ per cent.

In practice it would not probably be taken higher than 35 per cent. Starting, then, with 100 horse-power in the steam-engine, we lose 8 per cent in the dynamo in converting the mechanical into electrical energy. The output of the generator is then 92 horse-power. In the line we lose 10 per cent, and deliver 82.8 horse-power to the motor. Here we lose 15 per cent, and on the final reconversion into mechanical energy on the car we have 70.4 horse-power out of the original 100 horse-power. By no other known method could this power be transported to such a distance with so little loss.

ECONOMY. This is a quality that appeals more directly to the railway official than others. An electric railway connects Omaha with Council Bluffs across the new bridge. To run twenty cars per day they consume five tons of slack, for which they pay \$1.14 per ton. This is 28½ cents per day for fuel. These cars are scheduled at 15 miles per hour, and the average daily mileage per car is over 100 miles. Where natural gas or water is available, fuel may be even cheaper. On many different roads, from numerous measurements it has been found that where the grades are slight the power required averages from five to eight horse-power per car. The consumption of fuel varies from three to six pounds of coal per horse-power, according to the style of engine and its more or less economical operation.

On some roads, under very favorable conditions, the cost of renewals and repairs to electrical apparatus has been but a little below one dollar per day per car in actual operation. On other roads, under very favorable conditions, the cost of maintenance has been less than 25 cents per day per car.

A mean of the reports obtained from 11 roads in actual operation under different conditions shows a daily cost of operation of less than \$2.50 per day, not including drivers and conductors.

The objections urged against the overhead wires are: They are dangerous, as they carry death-dealing currents; they are in the way in case of fires.

The railway wire should not be confounded with other electric wires. Arc and incandescent wires, telegraph and telephone wires, have simply to carry the current from the point where it is generated to the point where it is to be used, and so far as this purpose is concerned they may be above-ground or under-ground. The railway wire, on the other hand, must have current taken from it every differential of an inch from one end to the other. The wire must be bare, that the trolley-wheel may be in constant

contact. To put this wire under-ground and to keep it properly insulated is a very different problem from burying the other wires. Now, as to danger. For railway work we use a constant potential generator, and the cars and motors are placed between the two conductors on the multiple-arc system. One conductor, the overhead wire, runs out from one pole of the generator; the other conductor, the rail, runs out from the other pole of the generator. An electrical connection between these two conductors completes the circuit, and the current flows through the connecting material, whatever it may be. If it be the motors on the car, then the cars move; if it be a man, he receives a shock.

Each connecting material, be it car, man or wire, receives a current of electricity which is determined by Ohm's law that the current is equal to the electromotive force or pressure divided by the resistance. The electro-motive force is always 500 volts. With several cars in operation the amperes of current in the overhead system near the generator may run as high as 180, but each car takes its own proportion according to its resistance. The average resistance of a man is 4,000 ohms. If he places himself in the circuit he will receive a current which is measured in amperes by dividing 500 by 4,000, or, in other words, a 500-volt current can only drive ⅓ of an ampere through the average human body. It would not make a particle of difference to the man whether the overhead wire he touched was carrying a current of 1 ampere or 180 amperes, or 180,000 amperes. The effect in his case would be the same: he would receive one eighth of an ampere. Were this not true, then the whole multiple-arc theory would be false, and electric railways, as at present operated, would be impossibilities. It would then make no difference as to danger whether one or a million cars were in operation on the line.

The current for railway work has been fixed at 500 volts, as this is well within the safe limits. A shock from 500 volts is unpleasant, but not dangerous. If there were any real question of its being dangerous, then 400 volts or 300 volts would be used. The objection to this, however, is, that by reducing the voltage we must correspondingly increase the quantity in order to retain the same horse-power, and an increase in quantity (amperes) means an increase in the size of the overhead wires, which is objectionable. The danger-limit with the electric current is probably about 1,000 to 1,200 volts.

Every overhead wire is objectionable to the fire commissioners; the railway wire is less objectionable than any other, because there is but one wire, and this wire is in the middle of the street, away from the buildings.

If the single overhead working conductor is insufficient to carry the current necessary to operate the cars, it must be re-enforced by feeder-wires. These feeder-wires may be insulated and may be placed underground. The overhead wire may be divided into sections of three, four, six or one thousand feet in length. At the ends of each section a cut-out or switch may be placed on the pole like a fire-alarm box, so that in case of fire the current may be cut out of the section or sections in the vicinity of the

fire. The firemen would then have no difficulty in handling the wires, which in any event are easily cut by pliers with insulated handles. But it may further be considered whether the overhead wire may not be made an aid to the fire department. As Professor Thomson pertinently remarked to the insurance representative: "It will not be long before you will be taking power from these wires to put out your fires. It will not be long before we have electric motor fire-engines."

RAILWAY UNION, AMERICAN. See **LABOR ORGANIZATIONS**, in these Supplements.

RAIMONDI, ANTONIO, a Peruvian historian. See **PERU**, Vol. XVIII, p. 679.

RAIMONDI, MARC ANTONIO. See **MARCANTONIO**, Vol. XV, pp. 530-532.

RAIN. See **GEOLOGY**, Vol. X, pp. 267-269.

RAINBOW. See **LIGHT**, Vol. XIV, pp. 595-597.

RAINES, JOHN, an American lawyer and public man; born in Canandaigua, New York, May 6, 1840. He graduated from the Albany Law School in 1861; served in the armies of the Potomac and North Carolina as captain from 1861 to 1863; was a member of the assembly of the state of New York in 1881, 1882 and 1885; was state senator in 1886, 1887, 1888 and 1889; was president of the board of education of Canandaigua; was elected to Congress in 1889 and re-elected in 1891. He was the author of the Raines Liquor Law; q.v., under **LIQUOR LAWS IN THE UNITED STATES**, in these Supplements.

RAINES LAW. See **LIQUOR LAWS**, in these Supplements.

RAINFALL. See **METEOROLOGY**, Vol. XVI, pp. 128, 129; and in these Supplements.

RAINIER, MOUNT. See **UNITED STATES**, Vol. XXIII, pp. 807, 808.

RAINY, ROBERT, a Scottish ecclesiastic; born in Glasgow, Jan. 1, 1826, and educated at the university there, graduating in 1843; studied theology at New College from 1844 to 1848; ordained minister of the Free Church in 1851; became professor of church history in New College in 1862, and in 1874 its principal. He was a prominent leader of the Free Church and an advocate of disestablishment. He wrote several theological works; among them, *Three Lectures on the Church of Scotland* (1872); *The Delivery and Development of Christian Doctrine* (1874); *The Bible and Criticism* (1878); and *The Epistle to the Philippians* (1892).

RAINY LAKE, a lake which forms a portion of the boundary line between British North America and the United States. It is situated 160 miles W. of Lake Superior; is 1,160 feet above sea-level, and is about 35 miles long and 5 miles in average breadth. Its surplus waters are carried off to the Lake of the Woods, in a west-northwesterly direction, by the Rainy River, which is about 100 miles in length, and the banks of which are covered with pine forests. It is dotted with numerous small islands, and its waters abound in fish.

RAINY LAKE CITY, a small town on Rainy Lake River, in the extreme northwest portion of Ontario, founded in 1894. In the following two years this place came into notice on account of the

reported discovery of gold. So far, no paying ore has been taken from this region, but the excitement has been sufficient to bring many people into the locality, and several small villages and hamlets have sprung up on both the American and Canadian side of Rainy Lake. Population 1896, about 1,500.

RALE, SÉBASTIEN, a French missionary; born in Franche-Comté, in 1657. He became a Jesuit and professor of Greek at Nîmes; went to Canada, arriving at Quebec, Oct. 13, 1689, and was stationed among the Abenaki and the Algonquin Indians, near the Falls of the Chaudière, learning their languages and customs; in 1692, went to Illinois; in 1694, took charge of the Abenaki mission at Norridgewock, on the Kennebec, and built a church. The Indians, incited by Frontenac and the French Jesuits, broke their treaty engagements with the British colonists. The English settlers laid the blame of their troubles with the Indians to Rale, and set a price on his head. They burned his church in 1705, and again in 1722 pillaged his house and carried away his dictionary of the Abenaki language, which they presented to Harvard College, and finally, in a third expedition in 1724, succeeded in killing him. In 1833 a monument was erected to his memory at Norridgewock. His Abenaki dictionary was published in 1833, and a memoir of him appeared in Sparks's *American Biography*.

RALEIGH, a city and the capital of the state of North Carolina. Its cotton trade alone averages considerably over one hundred thousand bales annually. Its manufacturing industries likewise are growing. As an educational center it ranks high, the schools for higher education including Peace Institute (Presbyterian), Raleigh Male Academy (non-sectarian), St. Augustine Collegiate Institute (Episcopalian), St. Mary's School (Episcopalian), Latta University (for negroes), and Shaw University (Baptist), a co-educational institution for negro students, which, in 1896, had 28 instructors, 362 students and a library of 2,000 volumes. The city has four libraries, including the state library, and that of the supreme court with its more than 55,000 volumes; has electric lights and street-railways, sewerage and water systems; 13 newspapers are published, of which three are daily. Population 1890, 12,678. See also **RALEIGH**, Vol. XX, pp. 261, 262.

RALLIDÆ, a family. See **RAIL**, Vol. XX, pp. 222, 223.

RALSTON, WILLIAM RALSTON SHEDDEN, an English archæologist; born in 1828; was educated at Trinity College, Cambridge, England, graduating in 1850. From 1853 to 1875 he served in the British Museum as an assistant librarian. He published several works on Russian folk-lore and translations from the literature of that country; contributed a great number of articles to English periodicals; and wrote the article on **ALEXANDER HERTZEN**, in this **ENCYCLOPÆDIA**. Among his works are *Kriloff and His Fables* (1869); *Songs of the Russian People*; and *Early History of Russia*. He died Aug. 8, 1889.

RAM, MARINE. See **NAVY**, in these Supplements.

RAMADAN OR RAMAZAN. See FASTING, Vol. IX, p. 49.

RAMAH, an ancient Hebrew stronghold. See SAMUEL, Vol. XXI, p. 252.

RAMAYANA, an ancient epic poem of India. See SANSKRIT, Vol. XXI, pp. 280-283.

RAMESES OR RAMSES, three kings of ancient Egypt. See EGYPT, Vol. VII, pp. 738-740.

RAMIE OR CHINA GRASS. See RHEA FIBRE, Vol. XX, p. 506.

RAMMOHUN ROY, RAJAH. See ROY, Vol. XXI, pp. 34, 35.

RAMOTH, a Hebrew city of refuge; scene of battle in which King Ahab was killed, and of the anointing of Jehu (1 Kings xxii; 2 Kings ix). See GILEAD, Vol. X, p. 595.

RAMPART. See FORTIFICATION, Vol. IX, p. 422.

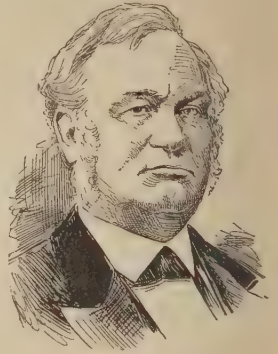
RAMSAY, SIR ANDREW CROMBIE, a Scotch geologist; born in Glasgow, Jan. 31, 1814. He became a director of the Geological Survey of Great Britain in 1845. He was professor of geology at University College, London (1848); lecturer at the Royal School of Mines (1851); president of the Geological Society of London (1862-63); and of the British Association for the Advancement of Science (1880); and director-general of the Geological Survey in 1872. Among his contributions to scientific literature are *Geology of North Wales* (1857); *Geological Map of England and Wales* (1859); and *Physical Geology and Geography of Great Britain* (1878). He was knighted in 1881, and died Dec. 9, 1891.

RAMSAY, WILLIAM, a Scotch chemist; born in Glasgow, Oct. 2, 1852. He received his education at Glasgow University, and later at Tübingen, where he graduated in 1872. He was assistant professor of technical chemistry in Glasgow University until 1880, when he became professor of chemistry at University College, Bristol; became principal in 1881, and professor of chemistry at University College, London, in 1887. He was elected a fellow of the Physical Society (1886), and of the Royal Society (1888), besides being a member of various other bodies. The most important of his works, and the one by which he is best known, is the description of argon, the new element of the atmosphere, which he discovered simultaneously with Lord Rayleigh.

RAMSAY, WILLIAM MITCHELL, a Scotch scholar; born in Glasgow, Scotland, March 15, 1851. He received his education at Aberdeen, Oxford, Göttingen and Berlin. On his return to England he became connected with Oxford; was made a fellow in 1882, and professor of classical art and archæology in 1885. The following year Aberdeen University called him to the chair of humanity. From 1880 to 1891 he made several excursions to Asia Minor. Dr. Ramsay became widely known through his magazine articles and the following publications: *Historical Geography of Asia Minor* (1890); *The Church in the Roman Empire Before A.D. 170* (1893); and *St. Paul's Travels* (1895). He contributed the articles on MYSTERIES; ORACLE; SMYRNA; PHRYGIA, and several others, to this ENCYCLOPÆDIA.

RAMSEY, ALEXANDER, an American statesman; born near Harrisburg, Pennsylvania, Sept. 8, 1815.

He graduated at Lafayette College, and early entered politics, being a clerk in the registrar's office in 1828. In 1840 he was secretary of the electoral college of Pennsylvania, and in 1841 clerk of the state house of representatives. In 1842 he was elected to Congress, serving four years. He was chairman of the Whig State Central Committee, and was the first territorial governor of Minnesota. He was mayor



ALEXANDER RAMSEY.

of the city of St. Paul in 1855, and governor of the state of Minnesota in 1860-63, being, in the latter year, sent to the United States Senate from that state, and holding his seat 12 years. In 1879 he succeeded G. W. McCrary as Secretary of War, and held the office till the close of Hayes's administration. In 1882 he was a member of the Utah commission, after which he acted as commissioner, in several instances, for the government.

RANAVALONA, MANJAKA III, Queen of Madagascar; born in 1861. She was crowned Nov. 2, 1883, succeeding Queen Ranavalona II, by whom she had been appointed as the future queen. Soon after ascending the throne she married Prime Minister Rainilaiarivony, who was deposed in October 1895, when a new ministry was organized under the French protectorate, which controls the interior administration of the island. The Queen lived a secluded life at Antananarivo. See also MADAGASCAR, in these Supplements.

RANCAGUA, a city and the capital of the province of O'Higgins, Chile; situated near the Rapel River, and on the Southern railroad, 45 miles S. of Santiago. In 1814 the patriot, General O'Higgins, was besieged here by the Spaniards, and, after a two days' fight (October 1st and 2d), withdrew from the ruined town with a remnant of his troops, this defeat practically putting an end to the first republic of Chile. Population of Rancagua, about 5,800.

RANCE, ARMAND JEAN DE. See TRAPPISTS, Vol. XXIII, p. 523.

RANDALL, JAMES RYDER, an American journalist and song-writer; born in Baltimore, Maryland, Jan. 1, 1839; educated at Georgetown College, District of Columbia; traveled for his health a number of years in South America, and on his return began newspaper work on the *Sunday Delta* in New Orleans. In 1866 he became editor-in-chief of the *Constitutionalist* at Augusta, Georgia. But it is as the author of the song *Maryland, My Maryland* (1861), that he is best known. Some of his other poems are *The Sole Sentry*; *Arlington*; *There's Life in the Old Land Yet*; and *The Battle-cry of the South*.

RANDALL, SAMUEL JACKSON, an American public man; born in Philadelphia, Oct. 10, 1828. He was a merchant, and held important municipal of-

fices; became state senator in 1858; served in the Union army during the first two years of the war and rose to the rank of captain; was elected to Congress in 1862; served again in the army during the Gettysburg campaign; was Speaker of the House from 1876 to 1881; was a member until his death, and was a very prominent leader of the protectionist wing of the Democratic party. He died in Washington, District of Columbia, April 12, 1890.

RANDALL MACHINE. See **HARVESTING MACHINERY**, in these Supplements.

RANDEGGER, CAVALIERE ALBERTO, an Italian composer; born in Trieste, April 13, 1832. He studied under Lafont for the pianoforte and under Ricci for composition; was musical director in theaters at Fiume, Zara, Brescia and Venice until 1854, when he went to London. He became widely known as a composer, conductor and teacher; was appointed teacher of singing at the Royal Academy of Music, London, in 1868; later became director; and in 1892 was made a knight of the Crown of Italy. His best-known works are *The Rival Beauties* (1864); *Bianca Capello* (1854); *Fridolin* (1873); and a *Funeral Anthem* for the death of the Prince Consort.

RANDOLPH, a town of Norfolk County, eastern Massachusetts, 22 miles S. of Boston, on the New York, New Haven and Hartford railroad. Its principal industry is the manufacture of boots and shoes, but harness, steel-roller forgings and boxes are also made. The Turner Public Library is a fine building, built of Randolph and Quincy granite, and contains 12,750 volumes. It has an endowed high school, a savings bank with deposits of one million dollars, and several papers. Population 1890, 3,946; 1895, 3,694.

RANDOLPH, a town of Orange County, central Vermont, 12 miles N. of Chelsea, on the Central Vermont railroad, and on White River. It comprises several villages, is situated in a good farming region, and manufactures butter-tubs, screens, lumber and woodwork. West Randolph is the business center and has the railroad station. It is the seat of a state normal school. Population 1890, 3,232.

RANDOLPH, EDMUND JENNINGS, an American lawyer and patriot; born in Williamsburg, Virginia, Aug. 10, 1753. He was a son of John Randolph, the royalist, and was disinherited by his father for taking the patriotic side; joined the army as aid to Washington (1775); was a delegate to the Virginia convention (1776); the same year succeeded his father as attorney-general; was a delegate to Congress (1779-82); governor of Virginia (1786-88); a member of the constitutional convention (1787); was the first Attorney-General of the United States (1789); and was Secretary of State in Washington's Cabinet (1794-95), resigning in August of the latter year because of a charge (afterward proved false) of having been engaged in an intrigue with the French envoy, Fauchet. He published a *Vindication*, and resumed the practice of law in Richmond, Virginia; was one of the counsel of Aaron Burr on his trial for treason; wrote a *History of Virginia*, the manuscript of which is now in the possession of the

Historical Society of Virginia. He died in Frederick County, Virginia, Sept. 12, 1813.

RANDOLPH, PEYTON, an American statesman; born in Williamsburg, Virginia, in 1723; graduated at William and Mary College; later studied law at the Inner Temple, London; was appointed attorney-general (1748); framed the remonstrance of the house of burgesses to the King against the passage of the Stamp Act (1765); on being chosen speaker of the house of burgesses, resigned the attorney-generalship; was chairman of the committee of correspondence (1773), and president of the first Continental Congress, at Philadelphia, Sept. 5, 1774, and again, when it reassembled, May 10, 1775. He died in Philadelphia, Oct. 22, 1775.

RANDOLPH, THOMAS MANN, an American statesman; born in Tuckahoe, Virginia, Oct. 1, 1768. He was educated in Edinburgh University; spent much time in study; was elected to Congress in 1803, and continued there till 1807. During the war with England he served in the army, rising to the rank of captain. He was governor of Virginia from 1819 to 1821, and died in Monticello, June 20, 1828.—His son, **GEORGE WYTHE RANDOLPH**, born in Monticello, March 10, 1818, was educated at Cambridge, Massachusetts. He became a midshipman, but resigned and studied law in Virginia. He was one of the commission sent by the state of Virginia to consult President Lincoln, in the hope of maintaining peace. At the outbreak of the Civil War he entered the Confederate army, rising to the rank of brigadier-general and serving till he was appointed Secretary of War by Jefferson Davis. Afflicted by pulmonary disease, he ran the blockade and went abroad for his health, remaining for a number of years. He died in Edge Hill, Virginia, April 10, 1878.

RANDOLPH-MACON COLLEGE, an educational institution located at Ashland, Virginia, with preparatory schools at Bedford City and Front Royal, and a woman's college at Lynchburg, with the same courses offered at Ashland. The college was founded by the Virginia and Baltimore conferences of the Methodist Episcopal Church in 1832, in Mecklenburg County, but after the war was removed to Ashland. There is an endowment of about \$450,000, besides the equipments. This, with all other sources of income, furnishes some \$45,000 yearly. There is a library of 12,000 volumes; the faculty in 1896 numbered 44, and the student body about 375. In the girls' school there are 15 teachers and about 125 students.

RANGE-FINDER. Owing to the great cost of manipulating modern guns it becomes essential to make each shot effective, and of late years much study has been given to this subject, and great advances have been made. Two recent devices for range-finding have been invented by Americans—one by Lieutenant Isaac N. Lewis of the army, and another by Lieutenant Bradley A. Fiske of the navy. That of the former is for battery use in coast-defense, and has been adopted by the United States army. This instrument is essentially a depression range-finder, requiring a height of at least thirty feet for effective use, and will give the range up to

eight miles. The instrument affords a rapid mechanical solution of a right-angled triangle, of which the vertical is the height of the instrument above the sea-level, and the base is the range of the object looked at through the telescope. It consists of a cast-iron circular table, upon which is mounted a telescope-holder, or cradle, pivoted in the center, and having the telescope pivoted at the front end of the cradle. The instrument can be manipulated by one person, who can find any range in five seconds. He has only to direct the telescope on the ship's water-line, read the range directly in yards from the range scale, and the direction of the ship from any given base-line from another device. The instrument has automatic corrections for refractions, rise and fall of tides, and curvature of the earth.

The Fiske instrument is not at all complicated, involving only elementary knowledge of mathematics and electricity. It is based on the familiar mathematical proposition that if two angles and one side of a triangle are known, the other two sides of the triangle can easily be found. The Fiske range-finder, however, eliminates all calculations, and finds the range automatically. A base-line fixed once for all on the ship, is the known side of the imaginary triangle. The distance of the object is represented by either of the other two sides. The target, therefore, is at one angle of the imaginary triangle, and at the other angles, at the extremities of the fixed base-line, are placed two spy-glasses, which can be directed upon it. As these spy-glasses are turned into the proper position they move over and touch wires which are bent in the form of arcs. The differences in length of the wires passed over corresponds mathematically to the distance of the object. As this length of wire increases or diminishes, it will offer more or less resistance to an electrical current sent through it. A very simple electrical contrivance, amounting practically to a balance, allows this resistance to be measured and read, not in units of resistance, but in yards. The two spy-glasses being pointed at the target, the observer at each spy-glass has nothing to do but to keep it thus pointed. Elsewhere in the ship, another observer may stand at a telephone, listening to a buzzing sound produced by an electrical device known as a circuit-breaker, and simultaneously moving with one hand a pointer over a graduated scale. The instant the buzzing in the telephone stops, he reads the range denoted by the pointer from the scale, and conveys the information by a simple form of telegraph to the men at the guns.

For coast-defense several improvements have been added to Fiske's instrument. The latest plan is to have the ground over which the battery sweeps delineated on a brass plate, which is fitted on the tripod of one of the instruments. Two pointers sweep over the plate, one of which remains parallel to the telescope overhead and the other is kept parallel to the telescope at the other end of the base-line by means of electrical connections. The brass plate is divided into a number of squares, the sides of which are in proportion to the sides of the squares into which the actual territory is divided.

The point of intersection of these arms is the exact location of the target. The distance of the target is found in the same way as on board a vessel. Then the whole is reported to the officer at the battery, the location being indicated by the squares.

Another range-finder was patented in 1896 by F. J. B. Codeiro, and is for use by hand. It consists of a telescope at one end of and at right angles to an arm about three feet long. A prism is at the end of the arm and another in front of the glass. These, when moved into the right position, reflect the image into the telescope. By means of a vernier scale one angle is obtained, and the right angle and base being known, the distance can be determined. See also *TELEMETER*, Vol. XXIII, pp. 126, 127.

RANIDÆ, the family of true frogs, consisting of about two hundred and fifty species, widely scattered over the world. Some species are aquatic, others arboreal. *Rana*, the typical genus, has over one hundred species. See also *FROG*, Vol. IX, p. 795.

RANKE, LEOPOLD VON, a German historian; born in Wiehe, Saxony, Dec. 21, 1795. He was educated at Leipsic, and in 1818 became a tutor in the gymnasium at Frankfurt; removed to Berlin in 1825 to occupy the post of professor extraordinary of history in the university there,—a position directly due to the reputation won the year before, after the publication of his first historical work, *A History of Latin and Teutonic Nations*. Soon afterward he obtained access to the

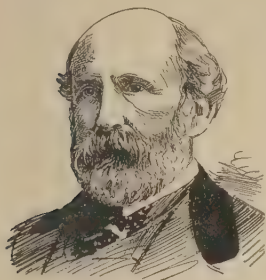


L. VON RANKE.

government records, and later produced *Nine Books of Prussian History* (1847), subsequently expanded to 12. His work, *The Popes of Rome: Their Church and State* (1837), while not his best, is his most widely read effort, having been translated into the language of almost every civilized people. At the age of eighty, Ranke began his *History of the World*, and lived to complete 12 volumes. He was assisted by the government in every way possible, and he well repaid all favors shown him. In 1865 he was ennobled; in 1867 he was made chancellor of the order *Pour le Mérite*; in 1882 he was made a Privy Councillor, and in 1885 his ninetieth birthday was made a national holiday, the Emperor William calling on him at his residence and congratulating him. Among his other works are *Princes and Peoples of Southern Europe in the Sixteenth and Seventeenth Centuries* (1827); *A History of Germany in the Time of the Reformation* (6 vols., 1839-47); *A History of England, Principally in the Seventeenth Century* (1859-68); and *History of Wallenstein* (1869). His habit of devoting his energies chiefly to the development of the obscure and doubtful points of history, and his critical methods, produced many imitators, who were generally characterized as of the "school of Ranke." His later works show no diminution of power, and he wrote till within a

few days of his death, which took place in Berlin, May 23, 1886.

RANSOM, MATTHEW WHITAKER, an American public man; born in Warren County, North Carolina, Oct. 8, 1826. He



M. W. RANSOM.

was educated at the University of North Carolina, and became a lawyer and planter; was elected attorney-general of North Carolina in 1852, resigned in 1855; a member of the legislature of North Carolina (1858-60); a peace commissioner from North Carolina to the congress of Southern states at Montgomery in 1861; entered the Confederate army, serving as lieutenant-colonel, colonel, brigadier-general and major-general, and surrendered at Appomattox; was elected to the United States Senate in 1872, and was re-elected in 1876, 1883 and 1889. He was appointed minister to Mexico in 1895.

RANTOUL, ROBERT, JR., an American public man; born in Beverly, Massachusetts, Aug. 13, 1805. He was a graduate of Harvard and began the practice of law in 1829, at once taking a high rank among the legal fraternity; was elected to the legislature in 1834, and served four years; was appointed United States district attorney for Massachusetts in 1845, resigning in 1849. In 1850 he was the organizer of the Illinois Central railroad. In 1851, when Daniel Webster resigned his seat in the Senate to assume the office of Secretary of State, Rantoul was appointed to succeed him for the remainder of the term, which was but nine days. Soon after he was elected to the House of Representatives, and served till his death. He was a violent opponent of slavery extension. He died in Washington, Aug. 7, 1852.

RANVIER, LOUIS, a French physician; born in Lyons, France, Oct. 2, 1835. He was educated at the Paris School of Medicine; became adjunct director of the laboratory of histology, and in 1875 was appointed to the chair of anatomy, especially created for him; became a member of the Academy of Medicine in 1886; of the Academy of Sciences in 1887; and received the decoration of the Legion of Honor in 1878. His works include *Observations Pour Servir à l'Histoire de l'Adénie* (1868); *Manuel d'Histologie Pathologique* (1869-72); *Traité Technique d'Histologie* (1875-88); and *Leçons d'Anatomie Générale sur le Système Musculaire* (1880).

RAPE. See MEDICAL JURISPRUDENCE, Vol. XV, p. 780.

RAPHALL, MORRIS JACOB, a Hebrew rabbi; born in Stockholm, Sweden, September, 1798. He was educated in Copenhagen and England. Later he studied at the University of Giessen, but returned to England in 1825; founded the *Hebrew Review*, the first Jewish periodical in England (1834); went to Syria in 1840 to investigate persecutions of the Jews; was called to New York in 1849, and remained in charge of a synagogue there until his death in

that city, June 23, 1868. His best work was a *Post-Biblical History of the Jews* (1856). He also wrote *The Path to Immortality* (1859) and *Bible View of Slavery* (1861).

RAPHIDES. See BOTANY, Vol. IV, p. 89.

RAPID CITY, a city and the capital of Pennington County, western South Dakota, 32 miles S.E. of Deadwood, on the Dakota, Wyoming and Missouri River and the Fremont, Elkhorn and Missouri Valley railroads, in the Black Hills. It is in a good grazing region, but is mostly devoted to mining, gold, tin and mica being mined in the vicinity. The mining of tin is being developed rapidly. Rapid City is the seat of the State School of Mines, and has several banks, churches and papers. Population 1880, 292; 1890, 2,128.

RAPID-FIRING GUN. See GUNMAKING, in these Supplements.

RAPP, JOHN GEORGE, a German religious teacher, founder of the Harmonists; born at Iptingen, Württemberg, in 1757. Believing in the speedy second advent of Christ, he desired to found a communistic settlement, but unable to do so in his native land, he went to America with his followers in 1803; founded the towns of Harmony, Pennsylvania, and New Harmony, Indiana, in 1815. He died in Harmony, Pennsylvania, Aug. 7, 1847.

RAPPAHANNOCK, a river of Virginia, formed by the union of the North Fork and the Rapidan, which rise in the Blue Ridge of the Alleghany Mountains and flow eastwardly to their point of union, forty miles above Fredericksburg, where the falls afford water-power. The river is navigable from this point southeast to Chesapeake Bay, which it enters by a broad estuary, seventy miles long. On the Rappahannock and the Rapidan occurred the sanguinary battles of Fredericksburg, Chancellorsville and the Wilderness. Length, about 250 miles.

RAPTORES or RAPTA LORES, an order of birds usually known as *Accipitres* (q.v., in these Supplements). The order includes the birds of prey, such as the eagles, owls, vultures and the secretary-bird. There are five hundred species, scattered over the world.

RARITAN RIVER, a stream of New Jersey rising in two branches in western Morris County, which flow southward and unite in Somerset County. It flows east into Raritan Bay; is about 70 miles in length, and is navigable for 15 miles, as far as New Brunswick, where it is joined by the Delaware and Raritan canal, which connects with the Delaware below Trenton, forming a short route between New York and Philadelphia.

RASKOLNIKS, a nonconformist sect. See RUSSIA, Vol. XXI, pp. 81, 82.

RASORES. See ORNITHOLOGY, Vol. XVIII, p. 46.

RASP. See FILE, Vol. IX, p. 160.

RASPBERRY. See HORTICULTURE, Vol. XII, p. 276.

RASSAM, HORMUZD, a British archæologist; born in 1826, in Mosul, in northern Mesopotamia. In 1845 he joined Mr. Layard to assist him in his Assyrian researches. When Mr. Layard returned to England in 1847, Mr. Rassam accompanied him to

complete his studies at Oxford, but at the end of 1849 he was sent out by the British Museum authorities to assist Mr. Layard in his second undertaking. Mr. Layard commissioned Mr. Rassam to succeed him. During this expedition Mr. Rassam discovered, in Nineveh, the palace of Sardanapalus. After this he held a political appointment at Aden; was British representative at Muscat in 1861; and sent as ambassador to King Theodore of Abyssinia to secure the release of some British citizens, but was himself imprisoned for two and a half years, when he and the others were released by Sir Robert Napier. Mr. Rassam published a narrative of the *British Mission to Theodore, King of Abyssinia*. In 1876 he was selected by the trustees of the British Museum to conduct the Assyrian explorations. From that time until July, 1882, he conducted the British national archaeological researches in Assyria, Armenia and Babylonia. He discovered, among other sites, the great cities of Sippara, or Sepharvaim, and Cuthah, situated in southern Mesopotamia. During the Turko-Russian war he was sent by the British Foreign Office on a special mission to Asia Minor, Armenia and Kurdistan, to inquire into the condition of the different Christian communities who were said to be maltreated by their Moslem fellow-countrymen.

RATIO. See **GEOMETRY**, Vol. X, pp. 382-390.

RATITÆ. See **BIRDS**, Vol. III, p. 699.

RATTAN OR RATAN. See **CANE**, Vol. IV, pp. 805, 806.

RAVENNA, a village and the capital of Portage County, northeastern Ohio, 22 miles W.N.W. of Warren and 32 miles S.S.E. of Cleveland, on the Cleveland and Pittsburg, the New York, Lake Erie and Western and the Pittsburg and Western railroads. It is a manufacturing place, producing glass, coaches and hearses, carbon articles, flour, lumber, castings, machinery, bricks, tiles, shoes, baskets, chairs, sad-irons, spokes and hubs. It also has a large dyeing establishment. It has a water system owned by the village, electric lights, banks, public and parochial schools. Population 1890, 3,417.

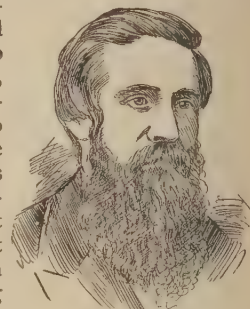
RAVENSTEIN, ERNEST GEORGE, a German geographer and statistician; born in Frankfort-on-the-Main, Dec. 30, 1834. He removed to London in 1852; held a position in the statistical department of the War Office (1855-74); was a member of the councils of the Royal Geographical and Royal Statistical societies; founded and for ten years was president of the German Gymnastic Society. He published the *Russians on the Amur* (1861); *Geography and Statistics of the British Empire* (1862); *London and the British Isles* (1877); *Englischer Sprachführer* (1884); and prepared a great many maps, including *Eastern Equatorial Africa*; *British East Africa*; and a *Topographical Map of England and Wales* (1893).

RAWDON-HASTINGS, FRANCIS. See **HASTINGS, FRANCIS**, Vol. XI, p. 516.

RAWLINS, a village and the capital of Carbon County, southern central Wyoming, on the Union Pacific railroad, 138 miles N.W. of Cheyenne. It is surrounded by mining and stock-raising sections; quarries of lime and building-stone and a

sulphur spring are near by. The railroad has machine-shops and a roundhouse here, employing a large number of hands. It is the seat of the territorial penitentiary, and has an extensive trade. Population 1890, 2,235.

RAWLINS, JOHN AARON, an American soldier; born in East Galena, Illinois, Feb. 13, 1831. After being engaged as a charcoal-burner, he studied law, and was admitted to the bar in 1854. In 1857, he was elected city attorney for Galena; in 1860 was an elector on the Douglas ticket. He was opposed to any armed interference with slavery, but when the war broke out upheld the administration heartily, and on enlisting was made aide-de-camp to General Grant, who had a high opinion of Rawlins's ability. He joined Grant at Cairo, with the rank of captain and assistant adjutant-general, and from that time was constantly with him till the end of the war. His promotion was constant and rapid, in 1865 he being brevetted major-general United States army. In 1869 he was made Secretary of War, holding that position till his death. He died in Washington, Sept. 9, 1869.



JOHN A. RAWLINS.

RAWLINSON, GEORGE, an English Oriental historian, brother of Sir Henry C., the soldier, was born at Chadlington, Oxfordshire, Nov. 23, 1815; educated at Swansea, Ealing and Trinity College, Oxford, where he graduated in 1838 as first class in classics; fellow of Exeter College (1840); a moderator of the university (1852); Camden professor of ancient history at Oxford (1861); canon at Canterbury (1872); rector of All Hallows, London (1888). He was Bampton lecturer in 1859, and published his discourses, which were on evidences of the historic accuracy of the Bible, and he defended the authenticity of the *Pentateuch* against the *Essays and Reviews*. His first historical work was an annotated English version of *Herodotus* in conjunction with his brother and Sir G. Wilkinson (1858-60). The sketch of the Greek historian in this *Encyclopedia* is from his pen (see Vol. XI, pp. 756-759). But he is best known for his *Five Great Monarchies of the Ancient Eastern World* (4 vols., 1862-67), to which he added *The Sixth Great Oriental Monarchy*, concerning Parthia (1873); *The Seventh Great Oriental Monarchy*, dealing with Sassanian Persia (1876). He also wrote a *History of Ancient Egypt* (2 vols., 1881); *Religions of the Ancient World* (1882); a *History of Phœnicia* (1889); *Moses, His Life and Times* (1887); *The Kings of Israel and Judah* (1889); *Isaac and Jacob* (1890); and *Parthia*, in *The Story of the Nations Series* (1893). He also contributed to several popular commentaries. As a historian he was conservative of orthodoxy rather than critical.

RAWLINSON, SIR HENRY CRESWICK, an English soldier, diplomatist and Orientalist, was born

at Chadlington, Oxfordshire, April 11, 1810. He served with distinction in Bombay (1827-33), in Persia (1833), and in Afghanistan (1840-43); held Kandahar against great odds; was consul at Bagdad in 1850; and became consul-general in Turkey in 1851; was knighted and made director of the East India Company in 1856; was special envoy to the Shah of Persia in 1859. As early as 1835, when stationed at Kermanshah, he began to study cuneiform inscriptions in Persia, and contributed to the Royal Geographical Society and the Royal Asiatic Society, London, the results of his archaeological and Biblical researches. With his brother, Canon George Rawlinson, and Sir G. Wilkinson, he participated in the production of an illustrated translation of *Herodotus*, and in conjunction with Mr. George Smith, the Assyriologist, he published, in 1860-70, the *Cuneiform Inscriptions of Western Asia*. In 1875 he issued a work on Oriental politics, entitled *England and Russia in the East*. Sir Henry also sat in Parliament as a Liberal, where he took an active interest in foreign affairs. In 1876 he was nominated vice-president of the Council of India, and received a baronetcy in 1891. He contributed geographical articles relating to Central Asia in this *ENCYCLOPEDIA*, of which the more important are BAGHDAD, Vol. III, pp. 231-234; EUPHRATES, Vol. VIII, pp. 668-672; HERAT, Vol. XI, pp. 713-715; ISPAHAN, Vol. XIII, pp. 393-396; and KURDISTAN, Vol. XIV, pp. 155-160. He died in London, March 5, 1895.

RAWLINSON, SIR ROBERT, an English civil engineer; born in Bristol, England, Feb. 28, 1810. In 1831 he entered the Liverpool dock engineer's office; was assistant engineer of the Liverpool corporation until 1844, when he became engineer of the Bridgewater canal; was appointed a sanitary inspector under the Public Health Act in 1848; in this capacity instituted a system of main sewers which has been adopted in many parts of the world. In 1855 he was sent to the Crimea to institute sanitary reforms in the army, as the result of which the death rate was much reduced. He served on several commissions, and was a member of the Army Sanitary Committee; was chairman of the royal commission for inquiring into the pollution of rivers; was knighted in 1883; and on his retirement in 1889 was made knight commander of the Bath.

RAWLINSON, SIR RAWSON WILLIAM, an English statistician; born in London, Sept. 8, 1812. He was appointed to the Board of Trade in 1829; rose to be first assistant to its chief,—a post which he held till 1842; was then sent to Canada as civil secretary; in 1854 became colonial secretary of the Cape of Good Hope; was later, also, made financial minister, and superintended the taking of the census; in 1864 became governor of the Bahamas and acting governor of Jamaica, was made commander-in-chief of the Windward Islands in 1869, and retired from service in 1875. He was a member of numerous societies, and on his retirement was made a knight commander of St. Michael and St. George. Among his publications are *International Vital Statistics* (1885); *Synopsis of the Tariffs and Trade of*

the British Empire (1888-89); and *Gospel Narrative; or, The Life of Jesus Christ* (1892).

RAY, ISAAC, an American physician; born in Beverly, Massachusetts, Jan. 16, 1807. He graduated at Harvard; practiced medicine at Portland, Maine, and removed to Eastport in 1829; gave much attention to insanity, and was appointed superintendent of the State Insane Asylum at Augusta, Maine, in 1841, and of the Butler Asylum, in Rhode Island, in 1845. He removed, in 1867, to Philadelphia, where he died, March 31, 1881. He wrote *Medical Jurisprudence of Insanity* (1838); *Education in Relation to the Health of the Brain* (1851); and *Mental Hygiene* (1863).

RAY, JOHN, an American lawyer; born in Washington County, Missouri, Oct. 14, 1816. He received a university education; removed to Monroe, Louisiana, and studied law, being admitted to the bar in 1839. From the first he took a high rank. He served, in early life, in both houses of the state legislature. He was a Presidential elector, in 1860, for Bell and Everett. For four years (1868-72) he was state senator, and was engaged in revising the state code of Louisiana. He was registrar of the state land-office in New Orleans four years. In 1873 he was elected to the Senate by the Kellogg legislature, but was rejected; was special attorney in 1878 to prosecute the "whisky ring" cases; also counsel in many other *causes célèbres*, among the most noted being the suit of Mrs. Myra Clark Gaines. He was the author of *Ray's Digest of Louisiana Law*. He died in New Orleans, March 4, 1888.

RAYLEIGH (JOHN WILLIAM STRUTT), BARON, the third of the title, an English physicist; born in Essex, England, Nov. 12, 1842, and succeeded to the title on the death of his father in 1873. He was educated at Trinity College, Cambridge; was senior wrangler and prizeman in 1865, and fellow of his college in 1866. In 1879 he was appointed professor of experimental physics at Cambridge, a post he held until 1884. He succeeded Tyndall in 1888 as professor of natural philosophy in the Royal Institution, London. A member of the Royal Society, he presided, in 1884, over the Association for the Advancement of Science. Besides many papers contributed to the *Transactions* of the Royal Society and other scientific publications, Lord Rayleigh wrote an important work on *The Theory of Sound* (2 vols., 1877-78; 2d ed. 1894), and in 1891 edited Professor Clerk-Maxwell's famous treatise on *Heat*. With Professor Ramsay he divided the distinction of having discovered a new element in the atmosphere labeled "argon," the existence of which was announced at the meeting at Oxford, in August, 1894, of the British Science Association. For his share in this discovery, Columbia College, New York, at the instance of the National Academy of Sciences, awarded Lord Rayleigh, in 1895, the



LORD RAYLEIGH.

Barnard medal "for meritorious service to science." To this *ENCYCLOPÆDIA* he contributed the treatises on *OPTICS*, Vol. XVII, pp. 798-807; and *WAVE THEORY*, Vol. XXIV, pp. 421-459.

RAYMOND, HENRY JARVIS, an American journalist; born in Lima, Livingston County, New York,



H. J. RAYMOND.

Jan. 24, 1820. He graduated at the University of Vermont in 1840, and the next year, when the *New York Tribune* was founded by Horace Greeley, was made assistant editor; became editor of the *Courier and Enquirer* (1843), and founded the *Times* in 1851. In 1849 he was elected to the legislature, and in 1850 became speaker; was elected lieutenant-governor of the state in 1854, and chosen for Congress in 1864. He was among the organizers of the Republican party in 1856, and wrote the *Address to the People* issued from the Pittsburg convention. His best work is *Life and Public Services of Abraham Lincoln* (1865). He died in New York City, June 18, 1869.

RAYMOND, JOHN T., an actor. See O'BRIEN, JOHN, in the Supplements.

RAZOR-CLAM, the popular name of a bivalve mollusk of the family *Solenidae*. The long and narrow shells suggested the name. The old typical genus *Solen* has been divided into the genus *Solen*, which includes the straight shells, and *Ensis*, which contains the curved shells. *Ensis Americana* is found on the sandy shores of the Atlantic coast of the United States. It burrows with great rapidity, and is not easily captured.

READ, GEORGE, a signer of the American Declaration of Independence; born in Cecil County, Maryland, Sept. 18, 1733. He took up the practice of law, and was attorney-general from 1763 to 1774; was a member of the Continental Congress, a signer of the Declaration of Independence, and a member of the constitutional convention in 1787. He held various state offices, and was appointed judge of appeals (1782); was elected United States Senator twice (1789 and 1793), but resigned to assume the duties of chief justice of the state. He died in New Castle, Sept. 21, 1798.

READ, JOHN MEREDITH, an American diplomatist; born in Philadelphia, Feb. 27, 1837; and received his education in a military school. He accepted in November, 1860, the office of adjutant-general of New York, and won the rank of brigadier-general at the age of 23. In 1869 he was appointed United States consul-general in France and Algeria, to reside in Paris. General Read likewise acted as consul-general of Germany during the Franco-German war, and afterward, for nearly two years, directed all the consular affairs of that empire, including the protection of German subjects and interests during the first and second sieges of Paris (1870-72). From 1873 to 1880 he was United States minister to Greece. During the Russo-Turkish war he discovered that only one

port in Russia for the delivery of grain was still open, and he pointed out to Secretary of State Evarts the advantages that would accrue to the commerce of the United States were a grain fleet dispatched for the peaceable capture of the European markets. The event justified his judgment, since the exports of cereals from the United States showed an increase within the year of \$73,000,000. In 1881 the King of Greece created him a knight of the Order of the Redeemer. He was president of the Social Science Congress held in Albany, N. Y., in 1868, and was vice-president of a similar congress held in Plymouth, England, in 1872. He died Dec. 27, 1896.

READ, OPIE, an American author, born in Nashville, Tennessee, Dec. 22, 1852; was educated at Neophogen College, Gallatin, Tennessee. Took up newspaper work upon graduation, and followed his profession in Little Rock, Louisville, Nashville and Cleveland. Finally started *The Arkansas Traveler*, a weekly paper of humor and literature, at Little Rock, Arkansas, which had quite a success until it was removed to Chicago and he resigned from its editorship, when it was discontinued. Among his stories of Southern life are *Len Gansett* (1888); *A Kentucky Colonel* (1890), which was dramatized, and made a decided hit on the stage, and which has been republished in England, where it has been received favorably; *Emmett Bonlore* (1891); *A Tennessee Judge* (1893); *The Wives of the Prophet* (1894); and *The Jucklins* (1896).



OPIE READ.

READ, THOMAS BUCHANAN, an American poet and artist; born in Chester County, Pennsylvania, March 12, 1822. The early years of his manhood were spent in wandering in various states of the Union. During that time he supported himself by means of two trades, cigar-making and sign-painting, which he had picked up in Philadelphia and Cincinnati, and by his contributions to different newspapers. He began to lead a regular life in Philadelphia, in 1846 opening a studio there. He went to Europe in 1850 and 1853, and afterward took up his residence in Rome, with occasional visits to the United States. During the Civil War he spent much time in the camps of the Union army, reciting his poems. Of his single poems, the best known is *Sheridan's Ride*, which appeared immediately after that famous war episode. Among his publications are *Poems* (1847); *Female Poets of America* (1848); *The Wagoner of the Alleghanies* (1862); and *The House by the Sea* (1856). Of his paint-



T. BUCHANAN READ.

ings are *The Spirit of the Waterfall*; *The Lost Pleiad*; and *Sheridan and his Horse*, illustrative of the poem mentioned above. He died in New York City, May 11, 1872.

READE, WILLIAM WINWOOD, an English traveler and author; born in Ipsden, England, in 1839. He traveled on the west coast of Africa in 1862-63; up the Niger in 1868-70; and accompanied the Ashantee expedition in 1873-74, as correspondent of the *Times*. He wrote a number of books containing the results of his travels, and several novels. Some of these are *The Veil of Isis*; or, *The Mystery of the Druids* (1861); *Savage Africa* (1863); *The Martyrdom of Man* (1872); *The Story of the Ashantee Campaign* (1875); and *The Outcast*, published the same year. He died in Wimbledon, April 24, 1875.

READING, a town of Middlesex County, Massachusetts, 12 miles N. of Boston, on the Boston and Maine railroad. Its chief industries are the manufacture of shoes, organ-pipes, metallic brushes, boxes, rubber goods and neckwear. It has a high school which offers a college preparatory course; its public library has 8,000 volumes; it has a fire department, water-works and several banks and newspapers. Population 1890, 4,088; 1895, 4,717.

READING, a city of southeastern Pennsylvania. On the summit of Neversink Mountain are two large hotels. From the summit of Penn Mountain runs a gravity road, eight miles in length, 1,140 feet above sea-level at its upper terminus, and at the lower terminus lies a beautiful park. The city has a service of electric street-railways; has a water-plant valued at \$1,500,000; gas, electric and steam-heating plants; a volunteer fire department, with electric alarms; several training and high schools; two libraries, containing over 10,000 volumes; hospitals and homes; banks, trust companies, and a board of trade. In 1890, 435 manufacturing establishments reported to the Census Bureau. These had an aggregate capital of \$14,000,000, hired 13,000 employees, and produced merchandise valued at \$21,000,000 annually. The main shops of the Philadelphia and Reading railroad, which employ about 1,000 hands, are located here. Population 1890, 58,661. See also READING, Vol. XX, p. 304.

REAGAN, JOHN HENNINGER, an American public man; born in Sevier County, Tennessee, Oct. 18, 1818. He settled in Texas in 1839; was a deputy surveyor of the public lands (1839-43); elected to the state house of representatives for two years in 1847; elected judge of the district court for six years in 1852; resigned, and was re-elected for six years in 1856; was elected, in 1857, a Representative to Congress, and was re-elected in 1859; was elected to the

provisional government of the Confederacy, March 6, 1861; reappointed, on the permanent organization of the Confederate government, in 1862, and occupied the position until the close of the war; was appointed acting secretary of the treasury of the Confederate government for a short time preceding the close of the war; a member of the state constitutional convention of 1875; a member of Congress (1875-86); elected to the United States Senate in 1886; was joint author, with Senator Cullom, of the Cullom-Reagan Interstate Commerce Act.

REALGAR. See ARSENIC, Vol. II, p. 635.

REALISM, in philosophy. See HAMILTON, Vol. XI, pp. 417, 418; SCHOPENHAUER, Vol. XXI, p. 457; and *Universals*, under SCHOLASTICISM, Vol. XXI, pp. 418 et seq.

REALISM is a name for the search for the actual, especially in the domain of philosophy and art. It might be said, by artificial thinkers, that all scientific investigations are a search for the actual, and hence realistic, but from a metaphysical point of view dealing with external phenomena may be very far from pursuit of reality. Without a metaphysic, the scientist is stranded inevitably upon a collection of unrelated observations, which is the precise difficulty Hume found in his speculations. To such a mind, cause and effect are reduced to a mere sequence in time, and the process of generalizing, or the use of hypothesis, has small value. Thus the modern physicist, from the doctrine of the correlation of forces, is driven to educe the principle that force is a fixed and eternal quantity; the chemist holds that there are indestructible atoms, the number of which is never increased or diminished; the biologist believes that life proceeds from life, and that species are developed by natural selection. These hypotheses, and they are no more, fruitful as they have been in illuminating the whole field of science, are the contribution of the human mind to the study of phenomena. The mind is philosophical, and because it is so, men come to a belief in natural law; and that is a most imperative necessity of thinking. The metaphysician will say that such laws are realities, and the scientist also assumes their inexorable and eternal nature. From both sides comes a common purpose to reach out for the absolute unity in which all phenomena, psychological and external, are related. If the scientist declares himself an agnostic, he simply means that his instruments of research and thought are inadequate to go beyond phenomena. These phenomena certain schools of philosophy call evanescent, and only the partial embodiment of persisting thought-realities. Yet the student of nature has a large number of hypotheses and mathematical relations, revealed to him by reflection, that are very dominant and actual in the world. In finding these laws of relation, he, too, is a realist of the most emphatic sort. To him they are the realest of things. Still, we do not apply the term *realism* to investigations concerned wholly with facts of nature, but only to those studies in which idealism and realism are relative terms. (See IDEALISM, in these Supplements.)

Art. The same spirit of reflection and criticism which prevails in other matters in modern times has had its influence on literary, graphic and plastic arts.



J. H. REAGAN.

secession convention of Texas in 1861, and was a deputy to the provincial congress of the Confederacy. He was appointed postmaster-general of the

It demands that imagination, with its romance and exuberance, give place to the representation of things as they are. There is no exact significance in the term *realism*, and according as they restrict it to faithful portraiture of vulgar things, or expand it to embrace faithful depicting of excellencies, the critics will condemn or applaud the school. It is a far call from Holman Hunt's *Shadow of Death* or *Flight into Egypt* to Bonnat's *Christ on the Cross*, and yet both men are realistic, Hunt having gone to the Orient to paint in his accessories of Christ in the carpenter's shop and the flight, while Bonnat chose to exhibit the anatomical contortions of pain. In literature, William D. Howells and Émile Zola are at the antipodes of realistic fiction, but, aside from quality of diction, the substantial difference of the men is in the choice of subjects.

Realism in Europe is supposed to be a peculiarly French production, because there the school has had the extremest development and the most advocates. Yet Adolfo Bartoli of Florence places its literary origin with Manzoni and Leopardi. A discussion of this point will be found under ITALY, Vol. XIII, p. 515. Tolstoi must be classed among the realists.

It by no means follows that all realists work on the plane of Zola's *L'Assommoir*. There is too much reason to regret that realism in art should be identified with the hard characters of *La Comédie Humaine*, or the procession of vulgar people in the *Rougon-Macquart* series. Flaubert and Couture are not the only, or the best, examples of this school, although an abundance of tales and pictures given to salacious, sordid and brutal themes have allowed the impression to go abroad that they alone are realistic. Realism has little to do with the choice of subjects, but with their manner of treatment when selected. The characteristics of it are a detailed exploitation of character; personalities in which the good and bad mingle in a natural way, none impeccable, but some, alas, without the luster of virtue; indifference to plot, sometimes neglect of it; no poetic rewards and retributions, but simply the unsolved common enigma of life portrayed. The artists deal with life as it is; romance recedes; the imagination is chained to experience, the mind to observation. But, clearly, all these qualities may inhere in a portraiture of estimable characters as well as in a tale of grisettes and men of the town. In art, whether literary or graphic, there will always remain some idealism. It is inseparable from personality. In its higher aspiration, realism is the effort to find art in natural and familiar things. It is often said that mechanical invention and the exactitudes of modern research are fatal to the artistic spirit,—that locomotives and telegraphs are not picturesque; that chemistry and electricity have inspired no epic nor lyric. Yet the wonders of invention and research do excite the imagination, if no true art has yet been found for the expression of that excitement. If art is suffering from a degeneration because modern emotions of wonder have found no imaginative forms of expression, it may be the function of realism to work out this problem of real life, until new art-forms are found that are pure and noble, even to the standards of the old romance.

Philosophy. Realism in metaphysic did not differ from the idealism of the Greek or neo-Platonic philosophers. It was simply the assertion that ideas were actual entities, and the prototypes of the phenomenal. It came into marked prominence among the schoolmen in opposition to nominalism. Nominalism asserted that existence was predicable only of individuals or particulars. To this the more orthodox schoolmen objected, that individuals were only parts of a process, and that taken by themselves they left particulars unrelated. They also thought it a theory destructive of personal identity, and hence of all philosophy, as well as of all theistic religion. Among the realists of mediævalism were some of the greatest theologians of the church, as Erigena, Anselm, Aquinas and Scotus. They held that particular things were only transitory, constantly giving way to similar successors; that beneath this pageant of nature was a persistent reality, the idea, or the universal, by which the phenomenal could be classified and related. Their assertion of the entity of universals was scholastic realism. This doctrine carried with it, in their estimation, the continuity of the soul, its responsibility and immortality, and the existence of God.

Since Sir William Hamilton's doctrine concerning the validity of perceptions was published the followers of the Scotch, or common sense, school call their philosophy "realism." Its last exponent, Dr. James McCosh, in 1887 restated its position in a treatise entitled *Realistic Philosophy Defended*. This is another sense of the term,—one which is not concerned primarily with universal terms. This school of philosophy assumes a like validity for sense-perceptions, as for other affirmations of consciousness. It claims as a postulate of common sense, that there is an external reality answering to the perception of it; that the perception of an external object is as unmediated as the perception of an idea. Both stand alike for realities. For Hamilton's doctrine, see Vol. XI, pp. 417, 418.

D. O. KELLOGG.

REALITY. See *Theory of Knowledge*, under LOGIC, Vol. XIV, pp. 797, 798.

REAL PRESENCE OF CHRIST IN THE SACRAMENT. See EUCHARIST, Vol. VIII, pp. 653, 654.

REAPING AND HARVESTING MACHINES. See AGRICULTURE, Vol. I, p. 332; and HARVESTING-MACHINES, in these Supplements.

REASON. See LOGIC, Vol. XIV, pp. 780-803; and ASSOCIATION OF IDEAS, Vol. II, pp. 730-734.

REBEC. See VIOLIN, Vol. XXIV, p. 242.

RECAPITULATION THEORY. See EMBRYOLOGY, in these Supplements.

RECAPTURE. See PRIZE, Vol. XIX, p. 766.

RECEIPT. See PAYMENT, Vol. XVIII, pp. 440, 441.

RECEIVER, as the term is used in law, is a person appointed by a court having chancery powers to take possession of the property of another, or a portion thereof, and receive the rents, profits and issues arising therefrom. A receiver is a ministerial officer of the court, with only such powers as the court confers upon him by order. He should be

disinterested in the controversy which has resulted in his appointment. Hence, generally, courts will not appoint attorneys interested in the suit, or officers of a corporation when the corporation property is to be turned over to a receiver, although these questions are left largely to the judgment and discretion of the court. A receiver is appointed only in cases where it appears to the court necessary for the protection of the property interests of some of the parties. Receivers frequently are appointed to assume control of real estate and collect the rents and profits thereof, when such real estate is the subject of litigation, as in the case of foreclosure of mortgages and other proceedings in equity. The most important use of receivers in the United States is in the case of financial difficulties arising in connection with business enterprises, in which, upon the application of creditors, or some one interested in the business, the court appoints a receiver to take charge of the business, and either continue its operation for the benefit of all parties in interest, or close it out and apply the proceeds in payment of the indebtedness. The right to appoint receivers for insolvent concerns, or those financially embarrassed, usually is provided by statute; and while the circumstances justifying such action, and the method for procuring the appointment of receivers, are substantially uniform, yet many minor differences are found among the various states. It is a general rule that a receiver will be appointed to take charge of the assets of a corporation if the officers are mismanaging its affairs or misappropriating its funds so as to endanger or impair the rights of creditors or stockholders. The disposition of the assets of a corporation for which a receiver has been appointed will depend upon the circumstances surrounding the case and the judgment of the court as to the best method of protecting the rights of interested parties. In the case of railroads and other large corporations, where interests are large and involved, and a great number of persons are interested, a receiver will frequently be permitted to conduct the business under direction of the court until all rights are determined fully and its affairs adjusted and placed upon a sound basis. In case of small corporations and partnerships, receivers are not often appointed, except in case of insolvency, in which case the receiver generally is ordered to dispose of the assets at the earliest time possible; and if he continues the business, it is usually only temporarily, until it can be closed out to the advantage of the parties in interest.

In such cases the appointment of a receiver is an insolvency proceeding enforced by the court. The distribution and administration of the assets by a receiver is governed by about the same rules as those which prevail in case of a voluntary assignment for the benefit of creditors to a person named by the debtor as assignee, the chief difference being that in one case the court compels the assignment, and in the other it is the voluntary act of the debtor. The pay of a receiver is usually left to the discretion of the court, and is allowed out of the assets of the estate. The remedy by procuring the appointment of a receiver of an insolvent concern is in very

general use, and results equitably to all parties. The proceeds, in such cases, are distributed *pro rata* among creditors, who generally are required to file verified statements of their claims with the receiver before being entitled to share in the distribution. The receiver or other creditors may file objections to these claims and require proof to be made thereof.

RECIPROCITY, in a political sense, means the interchange of commodities between the subjects of different governments without levying export or import duties thereon, free entrance being permitted by each government in consideration of like privileges extended by the other. Reciprocity is brought about by means of treaties. Such treaties may provide for entire freedom of trade between the citizens of the two countries, or they may provide that such free interchange shall apply only to specified commodities. The principle of reciprocity of trade has frequently been recognized in Europe since the fourteenth century, more especially between the free cities. From 1854 to 1866, under treaty between the United States and Great Britain, reciprocity was established between the United States and Canada as to certain commodities, mostly raw material or half-manufactured products. This treaty was terminated finally by notice from the United States to Great Britain, as provided in the treaty. In 1876 reciprocity was established between the United States and Hawaii. The system of reciprocity was not of great importance in the United States until the conference, brought about by Mr. Blaine, as the Secretary of State, between the states of the two American continents, which assembled at Washington, Oct. 2, 1889. This conference was assembled for the purpose of discussing means for better commercial relations between American nations. As a result of the exchange of views, Congress authorized the President to enter into negotiations for the establishment of reciprocity by treaty as to certain commodities. For the history of these measures, see UNITED STATES, in these Supplements.

RECITATIVE AND LYRICAL DRAMA. See MUSIC, Vol. XVII, p. 86.

RECLUS, JEAN JACQUES ÉLISÉE, a French geographer, and one of a family of extraordinary talent, was born at Sainte-Foy-la-Grande, Gironde, March 15, 1830, and educated in Rhenish Prussia. Holding extreme democratic opinions, he left France after the *coup d'état* of Dec. 2, 1851, and traveled from 1852 to 1857 in England, Ireland, the United States, Central America and New Grenada, where he stayed several years. On his return to Paris he communicated to the *Revue des Deux Mondes*, the *Tour du Monde*, and other periodicals, the results of his voyages and geographical researches. M. Reclus is the author of *Voyage à la Sierra Nevada de Saint-Marthe* (1861); *Les Villes d'Hiver de la Méditerranée et les Alpes-Maritimes* (1864); and in conjunction with his eldest brother is the author of a very valuable introduction to the *Dictionnaire des Communes de la France* (1864; 2d ed. 1869); and above all, *La Terre*, a magnificent work on physical geography, the English edition of which, entitled *The Earth*, has passed through two editions. When the in-

surrection of March 18, 1871, broke out, M. Reclus, after publishing an eloquent appeal to his countrymen in favor of conciliation, flung in his lot with the Commune. For this he was sentenced to transportation for life (November, 1871). His sentence was, however, commuted into one of banishment, in February, 1872. He subsequently resided at Lugano, in Switzerland. He was admitted to the benefit of the amnesty in March, 1879. In 1882 he gained fresh notoriety as the practical initiator of the anti-marriage movement; and his two daughters were actually "married" in his own fashion, without any religious or civil ceremony. Together with Prince Krapotkin, he was condemned at Lyons as a leader and organizer of the International, but he escaped from French law into Switzerland. In September, 1892, he was appointed professor of comparative geography at the University of Brussels. The first volume of his *Nouvelle Géographie Universelle* was published in 1875, the seventeenth in 1891. Besides the treatise on *The Earth*, above referred to, another section—that on *The Ocean*—of M. Reclus's *Universal Geography* has been translated into English. His other writings include *Histoire d'un Ruisseau* (1866); *Les Phénomènes Terrestres* (1873); and *Histoire d'une Montagne* (1880). He has three sisters, distinguished for their linguistic attainments and their published translations from German and English literary and scientific works.—Of his brothers, the eldest was MICHEL ÉLIE; born at Sainte-Foy, in Gironde, June 16, 1827. He was educated among the Moravians at Nieuwied, on the Rhine, and in theology at Geneva and Strasburg. The *coup d'état* of 1851 brought exile to him, as to Élisée, and he interested himself in promoting co-operative societies. During the insurrection of the Paris Commune in 1871, he served the Commune as director of the National Library, for which he was condemned to deportation as a usurper, and he took refuge in Zurich. He was a collaborator with Élisée in his geographical works, and contributed under varying pen-names to a great number of domestic and foreign journals.—Another brother, ONÉSIME, was born at Orthez, Basses-Pyrénées, in 1837; was for a time a student in Germany; served as a zouave in Algeria; visited many European countries; contributed to *Tour du Monde*; published *France et ses Colonies* (1875, new ed. 1889), and *Terre à vol d'Oiseau* (1879; illus. ed. 1885).—ÉLIE ARMAND EBENHAZER, another brother, was born at Orthez, March 13, 1843; entered the navy at 17; ship-lieutenant in 1871; naval ordnance officer under the Minister of Marine, Jauréguiberry; with Mr. Wyse was sent to inspect Panama in the interests of the interoceanic canal there; besides assisting in the *Reports* of this commission, he published *Panama et Darien* (1878), with maps and plants. The articles ETHNOGRAPHY, Vol. VIII, pp. 613–626, and FIRE, Vol. IX, pp. 227–232, in this *ENCYCLOPÆDIA*, are from his pen.—PAUL, a younger brother, and a physician, was born at Orthez, in 1847; studied at Nîmes, and took his medical degree in Paris

(1876); served in hospitals, becoming surgeon to the Broussais Hospital in 1880; published *Clinique et Critique Chirurgicales* (1884) and *Cliniques Chirurgicales de l'Hôtel Dieu* (1887).

RECOLLETS, a Roman Catholic order. See FRANCISCANS, Vol. IX, p. 699.

RECONNAISSANCE, GEOGRAPHICAL. See SURVEYING, Vol. XXII, pp. 712, 713.

RECONSTRUCTION. When the Confederate armies surrendered to the Union armies in 1865, the Confederate States passed under the control of the military power of the United States. But they were not members of the Union then: they were conquered territories. They had declared themselves out of the Union by their several acts of secession, and after their conquest were to be dealt with as in the case of other United States territories. But President Andrew Johnson maintained that the Southern states, after laying down their arms, were in the same constitutional relations to the United States government as before their secession. In pursuance of this view he appointed "provisional governors" for these states, although the laws of the United States gave him no right to appoint such officers. Only Congress can create offices in United States territories.

The provisional governors called upon the people of their states to send delegates to enact constitutions for such states. Conventions were held, and the ordinances of secession were repealed and slavery abolished; state constitutions were framed, and in some cases submitted to the people for ratification. In other cases the constitutions took effect from the authority of the conventions alone.

In all cases the colored population had no voice in framing these constitutions, nor in electing the governors, state legislatures, and other officers that were elected under these constitutions.

Congress, in its turn, refused to admit the representatives from the Southern states, and in effect declared that the method of reconstruction which had originated with the President was inconsistent with the United States Constitution. By adopting the XIVth Amendment to the constitution, on June 16, 1866, Congress declared as citizens all persons born or naturalized in the United States, and prohibited the states from depriving any person of life, liberty or property without due process of law, or denying to any person within their jurisdiction the equal protection of the laws. It declared that representatives should be apportioned by counting the whole number of persons in each state, excluding Indians not taxed. It provided that where the right to vote for any office of the United States or a state was denied to any male inhabitant, except for participation in rebellion or other crime, the basis of representation should be reduced in proportion to the number of such excluded citizens to the whole number of male citizens of 21 years of age in such state. It declared that no person shall be a Senator or Representative in Congress, or elector of President or Vice-Presi-

dent, or hold any office, civil or military, under the United States, or under any state, who having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the constitution of the United States, shall have engaged in insurrection or rebellion against the same or given aid and comfort to the enemies thereof. It also validated the public debt of the United States and excluded the payment of claims on account of the rebellion or for the emancipation of slaves.

This amendment was promptly rejected by Georgia and North and South Carolina, and ratification was withheld in all other states which had participated in the rebellion, except Tennessee, which promptly ratified it. As Tennessee by its ratification of the XIVth Amendment had virtually accepted the terms of pacification and reconstruction tendered by Congress, this state was, by a resolution of Congress on July 24, 1866, admitted to its former place in the Union and to representation in Congress. By this act Congress had definitely fixed the terms under which the Southern states should be admitted to their full privileges under the United States Constitution. It also withdrew from the President the power conferred upon him in 1862 to grant pardon and amnesty to persons who had participated in the Rebellion. By act of March 23, 1867, Congress declared that no legal governments existed in Virginia, North and South Carolina, Georgia, Mississippi, Alabama, Louisiana, Florida, Texas, and Arkansas. It divided these states into military districts, and placed them under military officers. Military courts were authorized, and all interference by state authority was declared null and void. Authority was conferred upon the enumerated states to form constitutions and choose senators and representatives in Congress; and it was declared that such states should be readmitted to the Union, and their senators and representatives to seats in Congress, when certain conditions should be complied with. These conditions were as follows: The constitution should conform to the Constitution of the United States; it should be framed by delegates chosen by a majority of the votes of the people of the states having the electoral qualifications prescribed by that act; it should be ratified by the same authority; it should be approved by Congress; that no person excluded from office by Amendment XIV should be eligible as member of the convention to form such constitution or vote for the same, or hold office thereunder; that such state should ratify Amendment XIV; that the admission of the state and of its senators and representatives to seats in Congress should take effect when that amendment should be ratified, and become part of the Constitution of the United States. The qualifications of voters prescribed in the act were, that all male citizens of 21 years of age and upward, of whatever color or previous condition, who had resided one year in the state, should be entitled to vote, ex-

cept where disqualified for participation in rebellion or for felony at common law. The act further declared all civil authority within the state prior to admission, provisional and subject to the military authority.

By the act just mentioned, Virginia constituted the first military district, North and South Carolina the second, Georgia, Alabama and Florida the third, Mississippi and Arkansas the fourth, and Louisiana and Texas the fifth military district. The President assigned to the command of the respective military districts Maj.-Gen. J. M. Schofield to the first, Maj.-Gen. D. E. Sickles to the second, Maj.-Gen. G. H. Thomas to the third, Maj.-Gen. E. O. C. Ord to the fourth, and Maj.-Gen. P. H. Sheridan to the fifth. Major-General Thomas was at his own request, on the 15th of March, 1867, relieved from the command of the third military district and Maj.-Gen. John Pope assigned to that command.

On March 23d and July 19th, 1867, Congress passed the so-called "Reconstruction Acts." The first of these acts was a modification of the previous act providing for government in the South.

It provided for a registration to be made in each of the states there enumerated under the authority of the military officers assigned to them, which should include the emancipated slaves with all other classes, excepting only such persons as had been disfranchised by previous acts. As the exact bearing of this act upon disfranchisements on the ground of aiding in the rebellion was in doubt, the second act of reconstruction was passed to remove such doubt. The persons excluded for participating in the rebellion were declared to be persons who, having been members of the legislatures or of the executive or judiciary of any of these states, had engaged in the rebellion, whether such complicity arose while holding such offices or at a later time.

Under these Reconstruction Acts the qualified voters were registered; elections were held for the choice of delegates to conventions for framing state constitutions; such constitutions were adopted and submitted to the people for ratification. The state offices were filled by election; the legislatures were convened and the state governments were placed in operation. The new state governments promptly adopted the XIVth Amendment, and the respective states were at once admitted to representation in Congress. The commands of the military districts were one after another withdrawn from the Southern states. In 1870 the last ones of these states were readmitted into the Union. After all the states were rehabilitated, Congress was willing and ready to grant an amnesty to those persons who had been disfranchised by the Reconstruction Acts. See also UNITED STATES, Vol. XXIII, pp. 784-787.

RECORDING ACTS. In the United States, statutes have been enacted in all of the states requiring that certain instruments be recorded in public records kept for that purpose, in order to give them effect against persons who have no

knowledge of their existence. These records are provided with indexes, and are open to public examination, so that any person interested may learn of the existence of the instruments recorded. It is generally necessary to copy the entire instrument in the record, so that the public may have notice of its contents. The whole system of land-titles throughout the United States has for many years been the subject of registration, and it is the rule that a conveyance not placed upon record will not have effect as against a subsequent purchase without notice of such conveyance. This system, therefore, renders it imperative that conveyances be placed upon record, as otherwise they may be defeated by subsequent deeds. The principle of the system of registration applies not alone to conveyances of land-titles, but has been extended and enlarged so that now in many states it includes instruments which relate to nearly every class of property. Varying in different states, the recording acts usually include, besides conveyances of land or interests therein, such instruments and claims as powers of attorney, bills of sale, chattel mortgages, town plats, mechanics' liens, homestead claims, and numerous other instruments. These laws have been instrumental in greatly decreasing the acts of fraud made possible by secret conveyances and liens, by requiring such instruments to be placed upon the public records as notice to those who may be interested. See also REGISTRATION, Vol. XX, p. 342; and TORNENS LAND-TITLE SYSTEM, in these Supplements.

RECOUPMENT, the reduction of a demand by the act of the defendant, by setting up in the same action his claim against the plaintiff for damages, growing out of the fact that the plaintiff has not fully complied with the obligations of the contract upon which he sues, or has failed to perform some duty which the law imposes upon him in the execution of the contract. Recoupment originated in the common law, and became useful to prevent circuity of action. Recoupment differs from set-off, in that the damage claimed must arise out of the same transaction upon which the suit is brought. The claim may be for unliquidated damages, and the defendant cannot recover judgment for any excess in his claim above the plaintiff's demand. The reverse is true as to set-off. Among the claims for which the defendant is entitled to recoup against the plaintiff's demand are for breach of warranty, fraud, failure of consideration, failure to deliver part of goods sold, for neglect of duty by attorney, for failure of landlord to repair, for defective performance of contract and for damage to goods by common carrier. The right to recoup for damages as to the claims above specified and many other similar claims as against the plaintiff's suit upon the cause of action out of which the defendant's claim arose, is accorded in almost all, if not all, of the states of the United States. In many states, however, the method to be used in recoupment is prescribed by statute; but, as a rule, the principles of the common law prevail as to the

right to recoup. As a general rule, it is necessary for the defendant to set up his claim for recoupment by way of a plea or notice to the plaintiff; but it has been held that when the claim for recoupment is large enough to extinguish the plaintiff's demand, it may be shown under the general issue. See SET-OFF, in these Supplements.

RECOVERY, COMMON. See FINE, Vol. IX, p. 194.

RECTOR. The many religious guilds that flourished during the middle ages and a great many universities were presided over by an officer whose title was rector. In the universities he was *rector scholarum*, while in the guilds he was *rector societatum*. In many universities in Scotland, France, Germany, and, in a few instances, in the United States in academies, the head of the institution is called rector, as are also the heads of Exeter and Lincoln colleges, Oxford. In the United States the title is used for a Roman Catholic clergyman in charge of a school or community, or in control of a congregation. In general, the head of a religious house in the Roman Catholic Church is termed a rector, and among the Jesuits the title applies to the head of a house which is also a college or seminary. In the Episcopal Church the rector is head of an incorporated parish. See also PARISH, Vol. XVIII, p. 296.

RECTUM, DISEASES OF. See DIGESTIVE ORGANS, Vol. VII, p. 228.

RED BANK, a town of Monmouth County, eastern New Jersey, 38 miles E.N.E. of Trenton, on the Shrewsbury River, near its junction with the Navesink, at the head of navigation, and on the Central of New Jersey and the Pennsylvania railroads. It also has regular steamboat connection with New York. It has national banks, a high-school, a public library, several canning establishments, and carriage and gold-leaf factories. Oysters and fish are important exports of the town. Population 1890, 4,145; 1895, 4,888.

RED-BIRD, a name often applied to the cardinal or Virginian grosbeak (*Cardinalis virginianus*). The male bird is brilliantly colored with red. See also GROSBEAK, Vol. XI, p. 209.

RED BLUFF, a city and the capital of Tehama County, northern California, 57 miles N. of Sacramento, at the head of navigation, on the Sacramento River and on the Southern Pacific railroad. Wheat, fruit, lumber, wool and stock are the main products of the vicinity, and in these products Red Bluff has a large trade. It has also a considerable river traffic, a glove, a broom and a soda factory, planing-mills and a foundry. Population 1890, 2,608.

REDBUD-TREE, the common name of *Cercis Canadensis*, a plant of the family *Leguminosæ*. It is a small and handsome tree of Central United States, very ornamental in early spring, when the naked branches are covered with small reddish flowers. Later the rounded leaves develop, and are followed by the flat thin pods. It is also called "Judas" tree.

RED CLOUD, a city and the capital of Webster County, south southeastern Nebraska, 35

miles S. of Hastings, on the Republican River, and on the Burlington and Missouri Valley railroad. It is in a stock and fruit growing region, and contains flour-mills, a foundry and machine-shops and grain-elevators. Population 1890, 1,839.

RED CROSS SOCIETY, an international association for the relief of the sick and wounded in time of war. Henri Dunant, a Swiss gentleman who aided the medical forces in 1859 in the Italian wars, was much impressed by the needless suffering of the sick and wounded. At the end of the war he published a book, *Un Souvenir de Solferino*, in which he advocated the idea of pledging all nations to regard as neutrals the sick and wounded in war-time, and of a universal society to care for the disabled soldiers. Receiving the cordial support of La Société Genevoise d'Utilité Publique, of which he was a member, he secured the co-operation of the Swiss Federal Council in calling for an international conference to devise some plan for the alleviation of suffering during wars. Such a conference was held in Geneva, in October, 1863, 16 governments being represented. Another was held Aug. 8, 1864, and again 16 nations were represented. Nine "articles of the convention for the amelioration of the condition of wounded in armies in the field" were drawn up and signed by 14 out of the 16 powers represented; since then the number of signers has grown to 40. Each treaty nation has a society. The insignia is a red cross on a white background, chosen as a compliment to the Swiss government, whose national emblem is a white cross on a red ground, and it may be used by the national societies only or at their discretion. In 1868 the regulations were adopted for naval warfare by a conference at Paris. The society is given the privileges of neutrals, and all patients under its care have a similar privilege and are treated alike. By the terms of the treaty, the red cross must in all cases be accompanied by the banner of the country in whose service the society operates. Under the direction of Clara Barton the American Red Cross Society was formed, including in its purposes not only relief of the injured in time of war, but also during great calamities, such as famine, pestilence, flood, or fire. This feature, which became known as the "American Amendment," received the unanimous sanction of the international and other national committees. Under this amendment the relief given by the Red Cross Society after the flood at Johnstown, Pennsylvania, in Russia during the famine and in Armenia after the atrocities of the Turk, have called for favorable comment from all parts of the civilized world.

REDDING, a city and the capital of Shasta County, northern California, on the Southern Pacific railroad, 24 miles N. of Red Bluff. Timber, lime, fruit and ore are abundant in the vicinity, and sheep are raised. The city has planing and saw mills and a foundry, banks, and two papers. Population 1890, 1,821.

REDEMPTIONISTS. See FELIX OF VALOIS, Vol. IX, p. 66.

REDEMPITORISTS. See LIGUORI, Vol. XIV, p. 635.

REDFIELD, a town and the capital of Spink County, northeastern South Dakota, on the James and Turtle rivers, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads, 40 miles N. of Huron. It is the center of a rich agricultural and dairy-ing region, and has a flour-mill and iron foundry, and three newspapers. It is the seat of Redfield College (Congregational). Population 1890, 796; 1895, 900.

REDFIELD, ISAAC FLETCHER, an American jurist; born in Connecticut, April 10, 1804. He graduated at Dartmouth, and began the practice of law in 1825; was attorney for Orleans County from 1832 to 1835, when he became judge of the supreme court of Vermont; in 1852 became chief justice, and retired from the bench in 1860. From 1857 to 1861 he held the chair of medical jurisprudence at Dartmouth; in 1861 made Boston his home, where he remained till his death. He was sent to Europe in 1867 as special attorney for the United States, to establish the claims of the government to property that had been purchased for the Confederates in England and France. He received the degree of LL.D. from both Trinity and Dartmouth; wrote numerous and valuable legal works, and for 14 years was the editor of the *American Law Register*. Among his books are *The Law of Railways* (1873); *Civil Pleading and Practice* (1868); and *Leading American Railway Cases* (1870). He died in Charlestown, Massachusetts, March 23, 1876.

REDFIELD, WILLIAM C., an American meteorologist; born near Middletown, Connecticut, March 26, 1789. He was in early life a mechanic, and in 1828 started a line of towboats on the Hudson; was interested also in railroads and street-railways. After observing the path of the great September storm in 1821, he proved that the storm had a progressive rotary motion. This led to his *Theory of Storms* (1831), and several pamphlets. He also made large collections of fossil fishes, and was first president of the American Association for the Advancement of Sciences. He died in New York, Feb. 12, 1857.—His son, JOHN HOWARD REDFIELD, born in Cromwell, Connecticut, July 10, 1815, was employed in a factory for making car-wheels, and later rose to be partner. He retired from business in 1885, and turned his attention to botany. He was appointed botanical conservator of the Academy of Natural Sciences, and had classified and catalogued the whole North American group of plants before his death, which occurred in Philadelphia, Feb. 27, 1895.

REDGRAVE, RICHARD, an English painter; born in Pimlico, London, April 30, 1804. He began to study from the marbles in the British Museum in 1822, and was admitted a student in the Royal Academy in 1826. A picture exhibited at the British Institution, *Gulliver on the Farmer's Table*, was his first success. In conjunction with

Mr. H. Cole he formed the Museum of Ornamental Art at Marlborough House, which enlarged under their joint charge into the Museum of Art at South Kensington. In 1851 Mr. Redgrave was named one of the jurors on the section of fine arts. The arrangements for representing British art in the Paris Universal Exhibition of 1855 were intrusted to him. In 1858 he was appointed surveyor of crown pictures. He resigned his appointment as keeper of the royal pictures and his connection with the Department of Science and Art in 1880. Among his works are *Sermons in Stones; Startled Foresters; Tranquil Waters; and A Well-spring in the Forest*. He died Dec. 14, 1888.

RED GROUSE OR MOOR-FOWL. See GROUSE, Vol. XI, p. 222.

REDIA. See TREMATODA, Vol. XXIII, p. 538.

RED JACKET, an American Indian, a celebrated chief of the Senecas, whose native name was Sa-go-ye-wat-ha ("He keeps them awake"); born at Old Castle, near the foot of Seneca Lake, in 1752. He sided with the British during the Revolutionary War, helped the Americans against Tecumseh 1809-10, and against the British 1812-14; retired to the Seneca Reservation, near Buffalo; lost his chieftainship for a time on account of drunkenness; was a violent opponent of missionaries and schools. He died at Seneca Reservation, Jan. 30, 1830.

REDLANDS, a town in San Bernardino County, southern California, 63 miles E. of Los Angeles and 8 miles E. S. E. of San Bernardino, on a branch of the Atchison, Topeka and Santa Fé railroad. It lies at an elevation of 1,300 feet, overlooking the beautiful San Gabriel Valley; is in an agricultural, mining and especially fruit-growing region, and has sewerage and water systems, electric lights and electric street-railways. The place is famous for its fine trees. It was founded in 1888. Population 1890, 1,904; 1895, 4,000.

RED LEAD OR MINIMUM. See PIGMENTS, Vol. XIX, p. 87.

RED LIQUOR. See CALICO-PRINTING, Vol. IV, p. 686.

RED MEN, IMPROVED ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

RED OAK, a city and the capital of Montgomery County, southwestern Iowa, 25 miles W. of Corning and 73 miles E. of Lincoln, Nebraska, on the Chicago, Burlington and Quincy railroad. It manufactures pottery, flour, carriages, furniture, sash and blinds. Population 1890, 3,321; 1895, 4,224.

REDOUBTS. See FORTIFICATIONS, Vol. IX, p. 434.

REDPATH, JAMES, an American author and journalist; born in Berwick-on-Tweed, England, Aug. 14, 1833. He emigrated, with his parents, to Michigan in 1848; became an editor of the New York *Tribune* at the age of 19; traveled through the South, and became noted as an abolitionist; was Kansas correspondent of the *Tribune* during the border warfare; was agent and consul for the Haitian government; was war correspondent dur-

ing the Civil War; founded negro schools and an orphans' asylum in South Carolina; established a lyceum bureau in Boston; traveled through Ireland during the famine of 1881 as correspondent of the *Tribune*; lectured in the United States on Ireland; published *Redpath's Weekly* in behalf of the Irish cause; and became an editor of the *North American Review* in 1886. He published *Handbook to Kansas* (1859); *The Roving Editor; or, Talks with Slaves in Southern States* (1859); *Guide to Hayti* (1860); *John Brown, the Hero* (1862); and *Talks about Ireland* (1881). He died in New York, Feb. 10, 1891.

RED RIVER, an affluent of the Mississippi. See RED RIVER, Vol. XX, p. 315.

RED RIVER EXPEDITION, a military undertaking of the Civil War. In 1864, after the Mississippi had been opened, an expedition was sent up the Red River, under General Banks. It was so timed as to take place during the spring freshets, and Rear-Admiral Porter accompanied Banks with 12 gunboats and 30 transports. The land forces were defeated at Sabine Cross-Roads, and retreated to Alexandria. By this time, April 8th, the water had receded, and it was found impossible to get the fleet below the rapids. The commanders were about to leave the vessels in order to save the entire force of troops, when Lieutenant-Colonel Bailey proposed to build a dam, and having received permission, on April 30th set to work and completed it by May 12th. The dam on one side of the river was made of trees, and on the other of stone, iron and rubbish. A passage sixty feet wide was left in the middle of the stream, which was deep enough to float the ships, thus saving the fleet from demolition. When the dam was finished four gunboats were floated over, but it was washed away almost entirely, and had to be rebuilt before the remainder of the fleet could be brought over.

RED RIVER OF THE NORTH. The scene of another Red River Expedition to suppress a half-breed rebellion. See RED RIVER, Vol. XX, p. 315.

RED SEAWEEDS, the common name of the *Florideæ*, a group of Algæ, mostly marine. They are among the most beautiful of plants, all having some shade of red or purple, and many of them of exceeding beauty and delicacy in form, and branching. They grow in the deeper waters, and have very characteristic organs of reproduction.

RED SNOW. The appearance of snow, as seen from a distance, is often an effect of light, which adds a peculiar charm to mountain and winter landscapes, particularly in the mornings and evenings, when the rays of the sun fall most obliquely on the surface of the snow. But snow is occasionally found in both polar and Alpine regions of a really red color. Saussure observed it in the Alps, and from chemical experiments concluded that the red color was owing to the presence of some vegetable substance. The next observations on red snow were made in the Arctic expedition under Captain Ross, when it was found

extending over a range of cliffs on the shore of Baffin's Bay for eight miles, and the red color penetrating the snow in some places to a depth of 12 feet. On the return of the expedition in 1819 the coloring-matter, as then existing in the melted red snow, was subjected to careful examination by Robert Brown and by Francis Bauer, the former botanist pronouncing it to be from a unicellular plant of the order *Algæ*, (see BOTANY, Vol. IV, p. 92,) an opinion which has since been confirmed.

RED WING, a manufacturing and commercial city of Minnesota, capital of Goodhue County. It is one of the most important wheat-shipping points in the southern part of the state; has manufactories of boots and shoes, flour, lumber, stoneware and extensive sewer-pipe factory and furniture factories. It has a seminary (Lutheran), state reform school, library of the state board of health, excellent schools and four collegiate institutions. It has electric lights and street-railways, and excellent water and sewerage systems. Population 1890, 6,294; 1895, 7,685. See Vol. XX, p. 319.

REDWOOD. See SEQUOIA, Vol. XXI, pp. 673, 674.

REDWOOD CITY, the capital of San Mateo County, central California, 22 miles S.W. of San Francisco, on the Southern Pacific railroad and on Redwood Creek (navigable). It contains a warehouse and a flouring-mill, also a courthouse and five churches. It is in an agricultural and grape-growing region, and is a shipping-point for redwood lumber. Population 1890, 1,572; 1895, 3,000.

REDWOOD FALLS, a village and the capital of Redwood County, southwestern Minnesota, 95 miles S.W. of Minneapolis, on the Chicago and North-Western railroad. It is in an agricultural district, and contains a handsome school building, and county courthouse, which was erected at a cost of \$30,000. In the vicinity are mines of gold, coal, and mineral paint. Population 1890, 1,238; 1895, 1,589.

REED, SIR EDWARD JAMES, an English naval engineer; born in Sheerness, Sept. 20, 1830. He was editor of the *Mechanics' Magazine*, and later, secretary of the Institution of Naval Architecture; was Chief Constructor of the Navy, but, owing to his objection to the rigged sea-going turret-ships which had come into favor, resigned in 1870. He became a member of Parliament in 1874; published valuable works on ship-building and coast defense, and was an eminent authority on naval construction. He was a member of various societies; served in many government commissions, and in 1878 was made Knight Commander of the Bath, receiving also decorations from Russia, Austria and Turkey in recognition of his services. He wrote *Japan: Its Histories, Traditions and Religions* (1880).

REED, JOSEPH, an American patriot; born in Trenton, New Jersey, Aug. 27, 1741. He studied law in England and practiced in New Jersey and Pennsylvania; was a delegate to the Continental

Congress in 1775; aide-de-camp and secretary to General Washington; adjutant-general in 1776; brigadier-general in 1777; signed the articles of confederation in 1778; and was president of the supreme executive council of Pennsylvania from 1778 to 1781. He became especially famous for his reply to the British when they offered him a valuable office and \$50,000 if he would persuade the colonies to return to their allegiance: "I am not worth purchasing; yet such as I am the King of England is not rich enough to buy me." He died March 5, 1785.—His grandson, WILLIAM BRADFORD REED, an American diplomat, was born in Philadelphia, June 30, 1806. He was a graduate of the University of Pennsylvania; studied law, and became attorney-general of the state in 1838; was minister to China in 1857, and negotiated the treaty of June 18, 1858. During the Civil War he went to New York, where he became editor of the *World*. He published *Life and Correspondence of Joseph Reed*, and a collection of essays, entitled *Among My Books*. He died in New York, Feb. 18, 1876.—Another grandson, HENRY REED, author, was born in Philadelphia, July 11, 1808. He was educated at the University of Pennsylvania; studied law; and in 1831 became professor of English literature at his alma mater. He was drowned while returning from Europe on the ill-fated steamer *Arctic*, Sept. 27, 1854. His works include a *Life of Joseph Reed* for Sparks's American Biography (1848); *Lectures on English Literature* (1855); *Lectures on English History* and *Lectures on British Poets* (1857). The works published after his death were edited by his brother, William Bradford Reed.

REED, THOMAS BRACKETT, an American statesman; born in Portland, Maine, Oct. 18, 1839. He graduated at Bowdoin in 1860, and studied law. In 1864 he entered the navy as acting assistant paymaster, remaining in that position till 1865. He then resumed his profession. In 1868 he was a member of the lower branch of the Maine legislature, and next session was a senator. He was attorney-general of the state for two years and city solicitor for Portland for four years. He was elected a member of Congress in 1876, and was re-elected continuously for over twenty years. In the Fifty-first Congress he was elected speaker of the House of Representatives, the vigor of his administration attracting widespread attention, and was again speaker in the Fifty-fourth. His rulings became widely famous as did, also, his revisions of the rules of the House. In the Republican national convention of 1896 his name was brought forward as a candidate for the Presidency. He was re-elected to Congress in 1896. An ardent Republican, prominent in the councils of his party, he aided the sound-money vic-



THOMAS B. REED.

tory of 1896 considerably by his forcible speeches. He wrote much for the leading reviews, mainly on political subjects, and published Reed's *Rules, A Manual of General Parliamentary Law* (1896). He was a Republican, and was one of the leading men on that side of the House. He contributed the article on CONGRESS OF THE UNITED STATES, to these Supplements.

REED-BIRD or RICE-BIRD. See ORTOLAN, Vol. XVIII, p. 53; and RICE-BIRD, in these Supplements.

REED CITY, a village of Osceola County, north-central Mich., 48 miles E. of Ludington and 88 miles N.N.W. of Lansing, on the Flint and Père Marquette and the Grand Rapids and Indiana railroads. The village has two grist-mills, four sawmills, a planing-mill, a sash and blind factory and a machine-shop. It has, besides, excellent water-power and a national bank with \$50,000 capital. Population 1890, 1,776; 1894, 2,247.

REED ORGANS. See HARMONIUM, Vol. XI, p. 483.

REEDSBURG, a village of Sauk County, south central Wisconsin, 14 miles N.W. of Baraboo and 45 miles N.W. of Madison, on the Baraboo River, and on the Chicago and North-Western railroad. It is noted as one of the large hop markets in that region. Population 1890, 1,737; 1895, 2,116.

REEFS, CORAL. See CORALS, Vol. VI, pp. 377, 378.

REES, JOHN KROM, an American astronomer; born in New York, Oct. 27, 1851. He received his education at Columbia College and at the School of Mines, where he graduated in 1875. After five years as professor of mathematics and astronomy at Washington University, Missouri, he became director of the observatory and adjunct professor of practical astronomy and geology at Columbia College in 1881 and professor of geodesy and practical astronomy in 1884. He was chosen managing-editor of the *School of Mines Quarterly* the same year, and wrote *Report on Total Solar Eclipses* (1878); *Observations of the Transit of Venus* (1884); and other works on astronomy.

REEVE, HENRY, a British editor and author; born in Norfolk, England, in 1813. He was educated at Geneva and Munich, and in 1837 was appointed Registrar of the Privy Council, an office which he held until 1887. In 1855 he became editor of the *Edinburgh Review*. He published translations of De Tocqueville's *Democracy in America*; *France Before the Revolution*, and Guizot's *Washington*; also published a collection of historical and biographical essays under the title *Royal and Republican France*; and contributed to this *ENCYCLOPEDIA*, among his articles being *AMBASSADOR*, *BALANCE OF POWER*, and *CONGRESS*. He died Oct. 21, 1895.

REEVE, TAPPING, an American jurist; born in Brookhaven, Long Island, in October, 1744. He graduated at Princeton in 1763; was a tutor there from 1767 to 1770; began practicing law at Litchfield, Connecticut, in 1772; founded a law

school there in 1784—the first school of this nature in the United States; was judge of the superior court from 1798 until 1814, when he became chief justice of the state. He published *The Law of Baron and Femme, of Parent and Child, of Guardian and Ward, of Master and Servant, etc.* (1816); and *A Treatise on the Law of Descents in the Several United States of America* (1825). He died in Litchfield, Connecticut, Dec. 13, 1823.

REEVES, MRS. HENRY, an English novelist; born in Crewkerne, England, 1852. Her maiden name was Helen Buckingham Mathers. In 1876 she was married to Mr. Henry Reeves, a surgeon and author of *Human Morphology*. Mrs. Reeves devoted herself entirely to writing. Her works include the poem *The Token of the Silver Lily* (1876); the novelettes, *The Land o' the Leal* and *As He Comes up Stairs* (1878); and the novels *Comin' Thro' the Rye* (1875); *My Lady Green Sleeves* (1879); *Eyre's Acquittal* (1884); and *A Man of To-day* (1894).

REEVES, JOHN SIMS, an English tenor singer; born in Shooter's Hill, near London, Oct. 21, 1822. He was trained to music by his father from an early age, and at 14 became organist of North Cray Church. He also became a proficient violinist, and sometimes undertook the duty of orchestral leader. He studied harmony and counterpoint under Calcott. In his eighteenth year he made his début at Newcastle-on-Tyne Theater, as the gipsy boy in *Guy Mannering*. He obtained an engagement at the Grecian Theater, London, where he sang under the name of Mr. Johnson; but in 1847, in *The Bride of Lammermoor*, at Drury Lane, then under the management of Macready, he first showed his full powers. Although very successful, he soon left the stage for the concert-room, and in oratorio and ballad-singing achieved the highest distinction. In 1843 he studied in Paris, and afterward at Milan, where he sang at La Scala. After his return to London he soon established his reputation as the first of modern tenors. He married Miss Emma Luccombe, a well-known singer. During 1891 he gave a series of farewell concerts, but did not entirely give up concert-singing. In 1892 he became professor in Guildhall School of Music, London.

REFERENDUM. Owing to the success of the referendum in Switzerland, especially as a check on hasty legislation, the subject has been discussed freely in the United States, and clubs formed to propagate the cause. In England the Parish Councils, under the Local Government Act, was an approach toward the referendum. See VETO, Vol. XXIV, pp. 207, 208.

REFLECTING ANGLE. See *Measuring-Instruments*, under SURVEYING, Vol. XXII, pp. 717, 718.

REFLECTION OF LIGHT. See LIGHT, Vol. XIV, pp. 586-600; also WAVE THEORY, Vol. XXIV, pp. 455-459.

REFLEX ACTION. See PHYSIOLOGY, Vol. XIX, pp. 28, 29.

REFORMATORIES. The establishment of reformatories for juvenile offenders was the first important step in the classification of criminals. This plan of separating juvenile and first offenders from adult offenders and recidivists was prompted and has been widely adopted, obviously because of the greater susceptibility of the former to reformatory influences. The majority of the states have made at least partial provision for the separate confinement of the juvenile delinquents, and in most of the rest of the states like provision is being made or is contemplated. The importance of surrounding those of criminal tendencies with wholesome and helpful environment at an impressionable age, of training them to perform some useful labor and to become productive and peaceful members of society, is being more and more deeply felt. This is further witnessed in the laws of many states, which provide for the separate trial of children, for their detention pending trial, in buildings or rooms apart from adults, and for their separate conveyance to and from court.

In spite of this tendency there yet remain many youthful delinquents who are not brought within the reach of reformatory influences. Many are to be found in jails and minor prisons and in association with adult and hardened criminals, for the most part awaiting trial and still innocent before the law. Indeed, more attention is given, as a rule, to the boy or girl after sentence than while awaiting trial.

The first reformatory established in the United States was the House of Refuge, Randall's Island, New York (chartered 1824), an outgrowth of the Society for the Reformation of Juvenile Delinquents. In 1890 there were in the country 58 reformatories, with a population of 14,846. To these institutions several have been added in the six years since, and there are in addition to these some private industrial schools and reformatories for wayward or incorrigible youth, which receive either by commitment from the courts or by surrender of the child by the parent or guardian.

There is a temptation common to most institutions to allow an increase of their numbers beyond the proper limits. That this temptation has been yielded to is apparent in the enormous size of some of the juvenile reformatories, in which from 400 to 2,000 inmates are accommodated. There is now a reaction in favor of small "farm" schools, such as the Lyman School for Boys at Westboro, Massachusetts; the Industrial School for Girls, Lancaster, Massachusetts; and the "Burnham Farm," New York, organized after the plan of the *Rauhe Haus*, or after the Mettray plan, where every facility is offered for training boys in farm-work and girls in household duties. This reaction is further apparent in special efforts that are made by private societies to find places for delinquent children in private families. The work of "placing out" of children of bad physical and moral surroundings, in the country on farms, has been going on for years in some of the largest cities. This work was begun

with the organization of the Children's Aid Society of New York, under the supervision of that great philanthropist, Charles L. Brace, and through it and kindred societies in Boston, Philadelphia and elsewhere, more than a hundred thousand boys and girls have been transplanted from a debasing environment to a wholesome one. Very few of the children sent to the country return to the city, and a very hopefully small percentage are ever chargeable on the community or commit criminal offenses. This preventive work must be reckoned among the first of reformatory influences among those who are criminal in their instincts or are in vicious and degrading environment. The statistics of crime in New York show a decided improvement in the matter of juvenile delinquency since the organization of these children's societies.

In this connection should be mentioned the work of such societies as the Children's Board of Guardians and the Societies for the Prevention of Cruelty to Children (q. v., in these Supplements), which are empowered to take children out of morally bad homes and to place them in better surroundings. The Children's Board of Guardians in the state of Indiana is a good example of the former type of organization, and the New York Society for the Prevention of Cruelty to Children of the latter.

The relative increase of juvenile delinquency, according to census returns, has been comparatively slight in the last decade, but these statistics cannot with safety be made the basis of any generalization, for the reason that there are so many causes that have an influence upon the result. The number in 1880 was 11,468 and in 1890, 14,846. The average age of all inmates of juvenile reformatories in the United States in 1890 was 14.23 years. Only a little more than three per cent could neither read nor write. Less than one half of one per cent had acquired a full knowledge of a trade, and less than three per cent appeared to be apprenticed to a trade. A very large percentage of the inmates of juvenile reformatories is engaged in some occupation while in confinement, but the labor is not with a view to profit as much as to training and preparation for life. At least half of the time is usually spent in the school-room.

Reformatories are now being established for older offenders, and existing prisons and penitentiaries are being converted into reformatories. (See PRISONS, in these Supplements.) This has been done in appreciation of the fact that older offenders are also susceptible to reformatory treatment, and that reformation, the primary object in the imprisonment of juvenile delinquents, may also successfully be made the chief object in prison discipline for older criminals. The tendency seems to be in the direction of providing institutions of a reformatory character for all who are capable of reformation, and places of custody for those who can never safely be returned to society again. This, at any rate, is the plan advocated by the foremost penologists, and the

institutions of the land are gradually responding to their ideas. See also REFORMATORY AND INDUSTRIAL SCHOOLS, Vol. XX, pp. 338, 339.

JOHN H. FINLEY.

REFORMED CHURCH IN AMERICA, formerly known as Reformed Protestant Dutch Church in North America; was planted in the United States by members of the Reformed Church of Holland, where its first synod met and adopted confessions at Antwerp in 1563. The mother-church was presbyterian in government and Calvinistic in doctrine. This church adheres to the Apostles', the Nicene and the Athanasian creeds, the Belgic Confession and the Canons of Dort. The *Heidelberg Catechism* is expounded in the pulpit, taught in the homes, and is an authoritative manual of religious instruction. The government of a congregation or parish is by elders and deacons, elected for two years. These form a consistory having power to call a minister, and with him to receive and dismiss members. They also act as trustees of the church property. Ex-deacons and elders form what is called the "great consistory," an advisory body. One elder, together with the minister from each church in a convenient district, form what is termed a classis, an ecclesiastical body having spiritual charge of the district. Four ministers and four elders from each classis of a larger territory form a particular synod, and similar representatives from each classis, the number proportioned to the size of the classis, form the *general synod*, an ecclesiastical body that finally adjudicates any dispute on spiritual matters that arises either in the churches, or in the classes, or in the particular synods. For an account of the origin and early history of this denomination in the United States, see PRESBYTERIANISM, Vol. XIX, pp. 696-671, 699, 698, 701.

In 1628 the Dutch settlers of New Amsterdam organized a congregation that worshipped in a loft over a horse-mill. Previously their religious instruction was cared for by schoolmasters, sent out by the West India Company. In 1635 a wooden church was built in Old Slip, and eight years later a substantial edifice was erected in the fort that stood near Bowling Green, and it was named in honor of St. Nicholas. In 1693 a third church was built in Garden Street, which became the first of the collegiate churches, when, associated with it, a new congregation was organized, and in 1729 began to worship in a new building that stood on the corner of Nassau and Cedar streets, where now the office building of a life-insurance company rears its lofty walls. This was known for a time as the Middle Dutch Church, though subsequently it came to be known as the South Church. Its large gray stone building was a British riding-school and prison during the Revolutionary War; from 1844 to 1877 it was the government post-office. The North Church joined the college in 1769, and its site was on Fulton Street. All these structures have disappeared with the northward march of New York

society, but the collegiate organization still exists and its board of trustees maintain (1896) six churches and chapels in the city, each of them notable for the dignity and beauty both of their buildings and services. The consistory of the city at that time comprised 27 churches.

This wealthy denomination has extended itself through regions occupied by the descendants of the Dutch colonists, and its strength lies in the towns of the Hudson River and Mohawk valleys, and in those of northeastern New Jersey. It was not until 1767 that the Collegiate Church substituted English for Dutch in its public services. Twenty-two years later an English hymnody came into use. The hymnal is under the control of the general synod, and is a fine collection of lyrics full of refined devotion. The denomination must be classed among liturgical churches, as it provides forms of worship for public services, the use of which is optional, and offices for the sacraments, ordination and discipline, the use of which is imperative. The scholars' black-silk gown is in common use by the pastors when officiating.

Classes of this denomination exist in Philadelphia and in the states of Michigan, Illinois, Wisconsin, Iowa and Dakota. Its church property was valued in 1890 at \$10,340,000.

Besides the general synod there were in 1895 four particular synods and 34 classes. There were 618 individual churches, 652 pastors and a total membership of 117,260. In their Sunday-schools, which numbered 894, there were 117,210 pupils. The total amount contributed for congregational support was \$1,022,206, and for benevolent purposes \$311,516. For foreign missions the sum of \$80,859 was given, the church maintaining missions in the Madura district in India, in Japan, in China and in Arabia. The most important missions are at North and South Arcot, Madura, founded in 1854, the center of some 117 out-stations, and having a large corps of native pastors, schoolmasters, catechists and readers. A theological seminary is also maintained in connection with the Arcot mission.

Several attempts have been made to effect a union between the Dutch Reformed and the German Reformed churches in America. Committees from the general synods of the Dutch and of the German Reformed Church met in 1890 and drafted a plan of federation, but after considerable discussion the matter was dropped in 1894. This church is one of the constituents of the General Alliance of Reformed churches holding to the presbyterian system.

Four colleges and three theological seminaries are conducted under the auspices of the denomination. The colleges are: Rutgers, at New Brunswick, New Jersey; Hope, at Holland, Michigan; Northwestern Classical Academy, at Orange City, Iowa; and Pleasant Prairie College, at German Valley, Illinois. The seminaries are at Rutgers, at Hope, and one in India. Rutgers Seminary was organized in 1785, and had in 1894, 5 professors and 42 students, a scholarship fund of \$111,071, a general fund of \$400,000 and a library of 43,000

volumes. Hope College had, in its theological department, 3 professors and 22 students. The seminary at the Arcot mission, India, under W. W. Scudder, had 15 students. The weekly periodical issued as the organ of the denomination is the *Christian Intelligencer* (New York).

REFORMED CHURCH IN THE UNITED STATES, formerly known as the German Reformed Church, had its origin among the early immigrants who were adherents of the Reformed Church of Germany, and began to settle in Pennsylvania about 1684. True to the doctrines of the mother-church, they early adopted and have ever since retained the Heidelberg catechism as their rule of faith and their only binding authority in matters of doctrine. This catechism, which was prepared by certain professors in Heidelberg University, and first published in 1563, teaches the natural depravity of man; salvation by grace; spiritual presence in the symbols of the Lord's Supper; baptism of infants; election of grace; but it discards the dogma of reprobation. No images are to be tolerated in the churches; the church order is presbyterian. The first independent church established by this denomination was presided over by Rev. John Philip Boehm, who began to preach in what is now called Boehm's Church, Montgomery County, Pennsylvania, in 1720. In 1727 the first Reformed Church of Philadelphia was founded, under the pastorate of George Michael Weiss. Churches were also founded in New York and as far south as South Carolina. All these were connected with and under the supervision of the classis, in Holland, of the Dutch Reformed Church, until in 1793 independence was effected by the organization of a synod. There were then in all about one hundred and fifty churches. In 1824 the synod of Ohio was formed. The general synod was not formed until 1863. The synods are composed of representatives of the classes, the same as in the Dutch Reformed Church, the general synod meeting once in three years and exercising advisory and supervisory powers. Among the educational institutions conducted under the auspices of the denomination are the college and seminary at Mercersburg, Pennsylvania, founded at Carlisle in 1835; Franklin and Marshall College, at Lancaster, Pennsylvania; Ursinus College and Seminary, at Collegeville, Pennsylvania; Catawba College, at Newton, North Carolina; Heidelberg University, at Tiffin, Ohio; Calvin Institute, at Cleveland, Ohio; Palatinate College, at Myers-town, Pennsylvania; and a theological seminary at Howard's Grove, Wisconsin. At the beginning of 1895 there were 8 synods, 55 classes, 1,646 congregations, with an aggregate membership of 221,473. The Reformed Church publishes 29 periodicals, 23 in English and 6 in German; supports foreign missions in Japan and in India, and sustains many home missions among the Indians and among recent or impoverished immigrants from Europe. See under **PRESBYTERIANISM**, Vol. XIX, pp. 699-701.

REFORMED EPISCOPAL CHURCH, the

name of a religious body in the United States, which separated from the Protestant Episcopal Church in December, 1873, under the leadership of Bishop G. D. Cummins, who up to this date had been bishop of Kentucky in the older church. For two generations there had been much irritation existing between the Low and High Church parties of the Episcopal denomination. About the time of the general convention of 1868 the rancor of this dissension culminated in several ecclesiastical trials of evangelical clergymen, Mr. Cheney being deposed from the ministry and Mr. Tyng publicly reprimanded, ostensibly for violations of the canons, but none the less for acts expressing their evangelical views. In the autumn of 1873, during a session of the general convention, Bishop Cummins participated in a meeting of the Evangelical Alliance of New York, and especially shared in administering the rite of the Holy Communion. Although not disciplined in his own church for this act, he felt that he encountered estranged friends and the obloquy of associates. Accordingly he resigned his jurisdiction, called about him a small body of sympathizers, clerical and lay, organized a church of this title, in New York, on the 2d of December, and published a declaration of its principles. This denomination adheres to episcopacy, not as a divine right, but as an ancient and desirable form of church polity. It adheres to the doctrines of faith as set forth in the thirty-nine Articles and in the Apostles' Creed; it recognizes the Holy Scriptures as the sole rule of faith and practice; it retains a liturgy which is practically a revision of the Proposed Book of Common Prayer published by the first convention of the Episcopal Church in 1785. (See **PROTESTANT EPISCOPAL CHURCH**, in these Supplements.) This denomination rejects the notion that the church of Christ exists only in one order or form of polity; that Christ's ministers are priests in any other sense than as all believers are; that the Lord's table is an altar on which the body and blood of Christ is offered perpetually to the Father; that the presence of Christ in the eucharist is to be found in the elements; and that spiritual regeneration is inseparably dependent upon baptism.

The governing body of this church is styled the General Council. It first met in 1874, in New York. In this council bishops, clergymen and laymen meet without separation of orders. In it is vested authority over all Episcopal parishes in America. Under this supreme body are the synods of Canada; New York and Philadelphia; and Chicago; also missionary jurisdictions of the Pacific; two of the South, one being for colored persons; and one of the West and Northwest.

In 1877 a branch of this church was established in Great Britain, but in 1883 the branch obtained an independent existence. In 1894 it merged in the Reformed Church of England.

Bishop Cummins was presiding bishop of this denomination until his death in 1876. His successors in this position have subsequently been chosen from time to time in each general council.

In 1894 this church comprised 8 bishops, 90 presbyters, 112 parishes and missions, and about 11,000 communicants, and held property valued at \$1,500,000. It has one theological seminary, in Philadelphia.

REFORMED PRESBYTERIAN CHURCHES in the United States owe their origin to the Scotch Covenanters (q.v., Vol. VI, pp. 529, 530), who held to such a belief in the kingship of Christ, that any form of human government that did not distinctly recognize the superior sovereignty of God could not receive their conscientious support. Adherents to this faith, who began emigrating to America in the early part of the eighteenth century, founded churches based upon such an adherence to the general presbyterian system as is common to all lands, and especially affirming the headship of Christ. The dissensions and disruptions that afterward occurred were mainly caused by a more or less rigid interpretation of this important article of faith. The Associate Presbytery of Pennsylvania, organized in 1753, and that of New York, organized in 1776, together with the Covenanters who had organized the Reformed Presbytery in 1774, united in 1782 to form the Associate Reformed Synod of North America. Many of the individual members of the first-named bodies, suspecting laxity of faith, refused to join, and reorganized the Associate Presbytery and the Reformed Presbytery; the latter body condemns instrumental music in churches, and still adheres to the use of the old Scotch version of the Psalms for congregational singing. A Reformed Dissenting Presbytery was also formed, which, however, seems to have been discontinued or merged in other bodies.

The reformed presbyteries organized a synod in Philadelphia and a general synod in 1823. They taught adherence to the Westminster Confession, with the proviso that anything which seemed to sanction any power in civil magistrates over ecclesiastical affairs be omitted. Ten years later came the great disruption into New Lights and Old Lights, or those who believed it right to vote and accept office under the Constitution of the United States, and those who refused thus to sanction any government that had not "God in the Constitution." The divided bodies have since been known as the Reformed Presbyterian Church in North America and the Reformed Presbyterian Church in the United States; the latter represented by the synod, which in 1895 numbered about 10,000 communicants and 116 churches, the former by the general synod, which the same year numbered 4,700 communicants.

In 1840 the Reformed Presbyterian Covenanted Church was formed by seceders from the Reformed Presbyterians, and in 1883 the Reformed Presbyterian Church of the United States and Canada was formed through a division among the members of the general synod. The Associate Reformed Presbyterians formed in 1802 a general synod, from which the Carolina synod withdrew in 1821, forming the Associate Reformed Synod of the South, which in 1895 numbered 10,088 communi-

cants. The Associated Reformed Presbyterians became merged in 1858 into the United Presbyterian Church (q.v.). See also under PRESBYTERIANISM, Vol. XIX, pp. 699-701.

REFRACTOMETER. Various instruments for widely different purposes are known by this name. One type consists of two telescopic tubes, between which a liquid may be placed, and the degree of its refraction tested by observing a light through the telescopes, and noting the angle at which they are set to bring the light into vision. (See DENSIMETER, in these Supplements.) Another form is the interference refractometer, which is a complex affair of mirrors and prisms, which reflect the light so that interference-fringes are produced. By observing the position and varying intensity of these fringes, minute measurements of extreme accuracy are possible. It has been used much in studying the lines of the spectrum, though originally employed to obtain indices of refraction. An ophthalmic refractometer has been devised for determining the necessary correction of distance vision, which is not easily obtained with the ophthalmometer, which measures only the limits of distinct vision. If the eye errs in refraction, the image is not formed exactly in the retina, and it is important that the oculist should know whether this image is formed in front of or behind the retina, that he may judge what sort of lenses will correct the error. The operation of discovering this with the ophthalmometer is very tedious, but the refractometer in question is provided with a series of lenses so mounted on the periphery of disks that a great variety of combinations is possible. By a little experimenting with these the proper combination of lenses is found, and the visual error may be corrected by providing the patient with lenses of similar quality.

C. H. COCHRANE.

REFRIGERATING APPARATUS. Refrigeration by the ammonia-expansion system is theoretically about forty per cent cheaper than the maintenance of a low temperature with manufactured ice; that is to say, the refrigerating capacity of such machinery is forty per cent greater than the ice-making capacity. As a consequence, where artificial cold is required in large quantity a refrigerating plant is used. About 1889 Denver and St. Louis were supplied with large plants for the delivery of cold through pipes, as heat is served. Numerous other cities are supplied similarly now. At the central station ammonia is liquefied by compression, acquiring much heat during the process. Then it is cooled and sent out through a main called the "liquid line" to the customer, in whose place are expansion coils very similar in appearance to steam radiators. The liquid ammonia, being let into an expansion coil through a valve in a very small stream, begins to evaporate, and in so doing absorbs heat and reduces the surrounding temperature. When it is evaporated and its cooling work is completed, it returns to the central station through another pipe called the "vapor line,"

a suction-pump assisting it on its return journey. A third pipe, called the "vacuum line," is essential to the proper working of the system. It is connected at intervals with the other lines, which are built in sections, and in case any repairs are required, any section may be shut off pumped out by the vacuum line and then receive the necessary attention. The vacuum line may also be used as a by-pass at times. When a section is pumped out in this way the workmen who open the pipes are not in the slightest danger from ammonia fumes, as the exhaustion is so perfect that not even the smell of it remains.

The laying of the pipes for a refrigerating system requires especial care. The customary plan is to make the pipe in half-sections. The lower halves are laid in a bed of concrete and thoroughly tested for leaks before the upper half is put on. A cement joint is then made between the two parts and the whole thoroughly protected and surrounded with cement. Manholes are placed at the ends of sections, with valves for shutting off the pipe. One advantage of this system is, that no cold is lost by expansion of the ammonia on the route. The ammonia is kept under pressure and in liquid form until it reaches the customer, and does not deliver its cold until it begins to vaporize in the expansion coils. Customers who require ice, as for table use, are supplied with small brine-tanks, in which they can place cans for ice to form. Artificial cold is purchased for the warehouses where fruit, meats, etc., are kept in cold storage, by hotels and restaurants for lowering the temperature of their rooms in summer, and by the public in general for miscellaneous purposes. See ICE-MACHINES, in these Supplements.

C. H. COCHRANE.

REGATTA. See ROWING, Vol. XXI, pp. 30-32.

REGELATION. See ICE, Vol. XII, p. 612.

REGENERATION. See BAPTISM, Vol. III, p. 349.

REGIMENT. See ARMY, Vol. II, pp. 564, et seq.

REGINA, a town in the district of Assiniboia and the capital of the Northwest Territory, on the Canadian Pacific railroad, 357 miles W. of Winnipeg. It is the center of a rich wheat-growing and grazing region. Population 1890, 1,681.

REGULATOR, ELECTRIC. Many forms of resistance-boxes are made for regulating electric currents for use as equalizers, stage regulators, storage-battery regulators, etc. The common pattern involves a box containing a set of spiral resistance-wires, in which wire is economized by the use of special switches to distribute the current through the resistance-conductors. One lever is arranged so that its insertion in full secures the maximum ampere-carrying capacity, with the least resistance. As this lever is withdrawn the resistance is increased, the different coils being released one at a time. Another lever is supplied for further increasing the resist-

ance as it is withdrawn by placing the spirals in series. This combination secures a regulator having maximum ampere capacity on the first step, with the spirals all in multiple, and a maximum resistance on the last step, with the spirals all in series. As a rule, the spirals of a resistance-box should be placed in a horizontal position, as they will lose heat by convection more rapidly in an upright position than when horizontal. Spirals are made from tinned iron, galvanized iron, and from German silver. The usual method of forming them is to wind on a mandrel and afterward stretch slightly to separate the convolutions.

C. H. COCHRANE.

REHAN, ADA, an American actress; born in Limerick, Ireland, April 22, 1860. When six years old she removed to America with her father and made her début at the age of 16 at Albany, New York, in *L'Assommoir*. After playing with Edwin Booth she was engaged in 1879 by Augustin Daly; went to London with his company in 1884, and achieved great success as Katherine in *Taming of the Shrew*, in 1888. She appeared in plays of Shakespeare and Tennyson in 1893. Among her other successful characters are Maid Marian in Tennyson's *Foresters*, and the leading rôles in *The Railroad of Love* and *The Squire*.



ADA REHAN.

REHOBOTH. See ISRAEL, Vol. XIII, p. 406.

REICHENBACH, CARL, BARON, a German chemist (1788-1869). See MAGNETISM, ANIMAL, Vol. XV, p. 278.

REID, SAMUEL CHESTER, an American naval officer; born in Norwich, Connecticut, Aug. 25, 1783; began a seafaring life when 11 years old; served in the West India squadron; was in command of a privateer in 1814, and, being attacked by the boats of three English war-vessels, scuttled his ship to prevent its capture; was sailing-master in the United States navy, and afterward warden of the port of New York. He was the inventor of the signal telegraph, and erected the one in use at Sandy Hook; was also a designer of the national flag, limiting the number of stripes to 13. His wife made the first flag, and it was floated over the Capitol at Washington, April 14, 1818. He died in New York City, Jan. 27, 1861.

REID, SIR THOMAS WEMYSS, an English journalist; born in Newcastle-on-Tyne in 1842. He was educated at Newcastle; became a journalist in 1861; in 1864 was appointed editor of the *Preston Guardian*, and in 1870-87 editor of the *Leeds Mercury*. He contributed largely to the leading reviews and magazines. He published *Charlotte Brontë: A Monograph* (1877); *Gladys Fane: A Story of Two Lives* (1883); *Mauleverer's Millions* (1885); *Life of the Right Hon. W. E. Forster* (1888); *Cabinet Portraits*, sketches of leading statesmen of both parties (1872);

Politicians of To-day (1879); and *The Land of the Bey* (1882), a narrative of a visit to Tunis during the military operations of France. He also contributed to the Leeds *Mercury* an extensive series of literary and social essays, under the title of *The Rambling Philosopher*, as well as letters descriptive of travel in various parts of the world. In 1887 he resigned the editorship of the Leeds *Mercury* and accepted the post of manager of the publishing-house of Cassell and Company. In 1890 he became editor of *The Speaker*, a weekly review. In 1891 he published a life of the late Lord Houghton, and in 1894 was knighted. He contributed the article on LEEDS to this *ENCYCLOPEDIA*.

REID, WHITELAW, an American editor; born in Xenia, Ohio, Oct. 27, 1837; graduated at Miami



WHITELAW REID.

University in 1856, and took editorial charge of the *Xenia News* during the year following. At the breaking out of the Civil War he became the Washington correspondent of the *Cincinnati Gazette*, and his letters, written from the capital over the name of "Agate," attracted widespread attention. Afterward he accompanied the Union army on its march South, and his description of the engage-

ments which occurred at various points in Virginia, Pennsylvania and Tennessee were valuable contributions to the record of the war. In 1865 he accepted an editorial position on the staff of the New York *Tribune*, and upon the death of Horace Greeley succeeded to the ownership and management of that paper. In the local, state and national campaigns which have occurred since Mr. Reid became a resident of New York, he exercised a powerful influence in shaping public opinion, and upon the accession of President Harrison was appointed United States minister to France. He wrote a number of books relating to the history of Ohio during the war, to the condition of the South after the war, and upon subjects of a political and journalistic character, and was one of the contributors of the article on NEWSPAPERS in this *ENCYCLOPEDIA*. He was a regent of the University of the State of New York, president of the Lotus Club of New York City, and of other leading organizations. In June, 1892, Mr. Reid was nominated at the Republican National Convention in Minneapolis for the office of Vice-President of the United States, but was defeated at the polls. On May 27, 1897, he was named special ambassador of the U. S. at the Queen's jubilee.

REIDSVILLE, a town of Rockingham County, northwestern North Carolina, 31 miles E. of Danbury, on the Southern railroad. The principal industry is the curing and sale of tobacco, there being sold about eight million pounds per year. There are several large leaf-tobacco warehouses, tobacco and cotton factories, lumbering and flouring mills. Population 1890, 2,969.

REIGN OF TERROR. See FRANCE, Vol. IX, pp. 606-608.

REIN, WILHELM, a German educationist; born in Eisenach, Germany, Aug. 10, 1874. He was educated at Jena, Heidelberg and Leipsic. After teaching a year he became professor in the Weimar Normal School; in 1876 became director of the Eisenach Normal School, and in 1886 professor in Jena University and director of the training-school. Among his works are *Theorie und Praxis des Volksschul-Unterrichts*, with Pickel and Scheller (1878); *Das Leben Dr. Luthers* (1883); *Am Ende der Schul-Reform?* (1893); and *Encyklopädisches Handbuch der Pädagogik* (1894). He was editor of several periodicals devoted to pedagogy.

REINDEER. See DEER, Vol. VII, pp. 24, 25.

REINDEER-MOSS. See LICHENS, Vol. XIV, p. 560.

REINHART, BENJAMIN FRANKLIN, an American artist; born at Waynesburg, Pennsylvania, Aug. 29, 1829, and studied his art at the New York National Academy. In 1850 he visited Europe and continued his studies at Düsseldorf, Paris and Berlin. Upon his return to the United States he located in New York, remaining there until 1860, when he went to England, and for the next eight years resided in London. In 1869 he again became established in New York, and in 1871 was made a member of the National Academy. His paintings, which consist largely of historical subjects and portraits of distinguished public men of Europe and the United States, are valued highly. Some of his works are *Cleopatra* (1865); *After the Crucifixion* (1875); *Nymphs of the Wood* (1879); and *Baby Mine* (1884). He died in Philadelphia, Pennsylvania, May 3, 1885.

REINHART, CHARLES STANLEY, an American illustrator and genre painter, nephew of the above; born in Pittsburg, Pennsylvania, May 16, 1844; became a clerk on a local railroad; engaged on a Virginia railroad during the Civil War, after which he returned to Pittsburg; in 1867 went to Paris, studied there, and in Munich (1868); returned to America in 1870; engaged with Harper and Brothers, with whom he remained six years; after working independently, returned to the Harpers in 1881, and the same year again went to France and Germany. It was during the next eight years that he really developed his talents as a painter, and which were becoming more conspicuous up to the time of his death. He became a regular exhibitor in the salons and galleries in Paris and London, and was elected an associate of the National Academy and of the American Water-Color Society. As an illustrator his work appeared in the publications of the leading New York publishing houses. Among his works in oil are *Clearing Up*; *Caught Napping*; *Rebuke*; *Old Lifeboat*; *Coast of Normandy*; *Flats at Villerville*; and *Washed Ashore*. Among his water-colors are *At the Ferry*; *Gathering Wood*; and *The Spanish Barber*. He died in New York City, Aug. 30, 1896.

REINKENS, JOSEPH HUBERT, a German theologian; born in Burtscheid, Aix-la-Chapelle, March 1, 1821, and was ordained priest in 1848. He filled various ecclesiastical positions; was professor for

several terms, and rector of the University of Breslau (1865-66). He was one of the 14 professors who, at Nuremberg, protested against the Vatican decrees in August, 1870. For this he was suspended from his professorship, and in 1872 he was excommunicated. Doctor Reinkens became a prominent leader of the so-called "Old Catholics," and was elected bishop of the new sect, June 4, 1873, at Cologne. He published numerous works bearing on theological controversies of the day, including *Hilarius von Poitiers* (1864); *Die Päpstlichen Dekrete vom 18 Juli, 1870* (1871); *Ueber Einheit der Katholischen Kirche* (1877); and *Lessing über Toleranz* (1883).

REISNER-WORK. See BUHL-WORK, Vol. IV, p. 446.

RELAPSING FEVER. See TYPHUS, TYPHOID AND RELAPSING FEVERS, Vol. XXIII, p. 680.

RELATIVITY. See ABSOLUTE, Vol. I, pp. 57, 58; PSYCHOLOGY, Vol. XX, pp. 49, 50.

RELEASE, in law, is the act of relinquishing a claim or right to the person against whom it is held. It may consist of a discharge of a right of action, or the conveyance of one person's interest in an estate to another who has possession thereof. In the former class, a mere right is abandoned, as the right to claim damages for breach of contract, or the like. In the latter, an interest is conveyed, as in case of the release of an interest in real estate created by mortgage. A release may be expressed or implied, or it may be by operation of law, as when one does an act which the law considers inconsistent with an intention to retain the right. Thus when one releases one of several joint obligors, the others are released by operation of law. A quitclaim deed, as used in the United States, is in the nature of a release of title. See QUITCLAIM, in these Supplements.

RELIEF CHURCH. See UNITED PRESBYTERIAN CHURCH, Vol. XXIII, p. 728.

RELIEFS. See SCULPTURE, Vol. XXI, pp. 556 et seq.; MURAL DECORATION, Vol. XVII, pp. 34, 35.

REMBERG. See JAVA, Vol. XIII, p. 606.

REMENYI, EDOUARD, a Hungarian violinist; born in Hungary, in 1830. He studied at the Conservatory of Vienna, under Joseph Böhm, from 1842 to 1845; took part in the insurrection against Austrian rule in 1848, and was compelled to leave the country. He made several tours throughout the United States, the last one being in 1893, and played in all parts of the world. His playing, which had a gipsy dash and fire to it, combined with mastery of technique, was exceedingly popular. He was of a roving disposition, and sometimes disappeared from the public altogether for lengthy periods.

REMITTENT FEVER. See MALARIA, Vol. XV, p. 317.

REMSEN, IRA, an American chemist; born in New York, Feb. 10, 1846. He graduated at the College of the City of New York (1865); from the College of Physicians and Surgeons (1867); attended the universities of Munich and Göttingen, and was assistant in chemistry at Tübingen (1870-72). He then returned to America and was professor of chemistry at Williams until 1876, when he accepted

the same position at Johns Hopkins. Much of his time was spent in independent research, and he published numerous articles and books, including *Theoretical Chemistry* (1876); *Organic Chemistry* (1886); *Introduction to Chemistry* (1885); and *Elements of Chemistry* (1887).

REMINGTON, FREDERICK, an American artist and illustrator; born in St. Lawrence County, New York, Oct. 4, 1861. He studied at the Yale Art School for two years, and in 1880 went to the Western cattle-ranges of Montana and Wyoming, and during the next four years lived the life of a genuine cowboy, which served to give him subjects for many of his sketches, and taught him the details of horses, Indians, and the men of the plains. In 1884 he sent to Harper and Brothers, New York, a number of drawings illustrating Western scenes, which were immediately accepted for their originality and freshness. He afterward illustrated several articles for Theodore Roosevelt, and some of his own. He traveled all over North America, and in various parts of Europe and northern Africa. He did some work in painting, and was elected an associate of the National Academy of Design. Among his better-known paintings are *The Dash for the Timber*; *The Last Stand*; *Past all Surgery*; *The Last Lull in the Fight*; and *Conjuring the Buffalo Back*. Added to his illustrative and artistic labors, his work as a sculptor places him in a peculiar position among American artists. His bronzes have attracted general attention; among them are *The Broncho Buster* and *The Wounded Bunkie*. His latest illustration is that of General Miles's *Personal Recollections* (1896). Mr. Remington published a volume, *Pony Tracks*, descriptive of his frontier experience.

RENAN, JOSEPH ERNEST, a French savant and Orientalist; born at Tréguier, Brittany, Feb. 27, 1823. He was a pupil of the celebrated Abbé Dupanloup, and was intended originally for the church. In 1845, however, his increasing scepticism and independence of thought culminated in his abandoning all thoughts of the church as a profession. At this supreme crisis of his life, his sister Henrietta, to whom Renan has paid the highest tribute of



ERNEST RENAN.

brotherly affection, proved an invaluable friend and counselor. By her assistance he was placed in a position in which he could follow out that purpose which had been gradually shaping itself in his mind—a life of study untrammelled by creeds or formularies. Thenceforward Renan's life was the uneventful one of the scholar. In 1848 he gained the Volney prize for a memoir upon the Semitic languages. His work, entitled *Étude de la Langue Grecque au Moyen-âge*, published in 1845, was crowned by the Institute. In 1849 he was sent to Italy on a literary mission by the Académie des Inscriptions et Belles-Lettres; in 1851 was attached to the department of manuscripts in the Bibliothèque

Nationale, and in 1856 was elected a member of the Académie des Inscriptions in place of M. Augustin Thierry. At the end of 1860 he was sent on a mission to Syria. In 1862 he was appointed professor of Hebrew, but did not permanently occupy the chair, in consequence of opposition to his radical views on religion. In 1863 he published his well-known *Vie de Jésus*, the result being that the author was dismissed from his professorship. M. Duruy, the Minister of Public Instruction, endeavored to conceal the significance of this dismissal by giving him an office in the Bibliothèque Impériale; he, however, strongly protested against the appointment, which was revoked June 11, 1864. At the elections to the Corps Législatif in May, 1869, he was an unsuccessful candidate. M. Renan was elected a member of the French Academy, June 13, 1878. He attended the congress of Orientalists held at Florence in September, 1878. In addition to the works already mentioned, he published numerous memoirs on comparative philology, and of a literary character. He was twice professor of Oriental languages in the College of France. In 1880 he received the cross of the Legion of Honor, becoming grand officer in 1888. He married a niece of the famous painter, Ary Scheffer.

Of the long list of Renan's works, the best known is undoubtedly his *Life of Jesus*, in which his rationalizing views, qualified by mysticism touching the sublime character of love and duty, find strong expression. This book forms a part of his *Histoire des Origines du Christianisme*, of which the other volumes are *Les Apôtres* (1866); *Saint Paul* (1867); *L'Antechrist* (1873); *Les Évangiles et la Seconde Génération Chrétienne* (1877); *L'Église Chrétienne* (1878); and *Marc-Aurèle et la Fin du Monde Antique* (1880). Between 1887 and 1891 three volumes of his *History of Israel* were given to the world. A fourth volume of this work completed the author's plan.

The estimates of Renan's work have been various, and, as in the case of all writers on theological subjects, mostly influenced by the prejudices of the critics. His *Jesus* was the creation of an erudite fancy, made attractive by the literary artist and the charm and gracefulness of his diction. There was a good deal of the epicurean in his philosophy, but despite that he was highly intellectual, as well as sincere and earnest. His later writings, in addition to *L'Histoire du Peuple d'Israël* (4 vols.), above mentioned, include *Recollections of his Youth* (1883); *Le Prêtre de Nêmi* (1885); *L'Origine de la Bible* (1886); *L'Abbesse de Jouarre* (1887); the Hibbert lectures delivered in London in 1880, on *The Influence of the Institutions, Thought and Culture of Rome on Christianity*; *L'Avenir de Science* (1891); *Examen de Conscience Philosophique* (1889); *Discours et Conférences* (1887); *Feuilles Détachées*; and *Recollections and Letters* (1892). See *Memoir and the Letters of Ernest and Henrietta Renan* (trans., 1895). He died in Paris, Oct. 2, 1892.

RENDEL, SIR ALEXANDER MEADOWS, an English civil engineer; born in England in 1829; the eldest son of James Meadows Rendel. He was educated at Canterbury and Cambridge, and studied

engineering under his father; in 1856, became engineer to the Leith Harbor and Dock Company, the London Dock Company, the East India railway, and other companies; and was consulting-engineer to the Secretary of State for India.—His brother, GEORGE WHITWICK RENDEL, also a civil engineer; born in England in 1832; was educated at Harrow, and studied engineering in the office of his father, whose assistant he was for some time; joined the Armstrong firm, as manager of the ordnance department at Elswick; designed and carried out a system of hydraulic machinery for working heavy guns; designed numerous gunboats; was a member of several commissions, especially the one appointed in 1871 to settle the types of English ironclads; was Civil Lord of the Admiralty from 1882 to 1885; and a member of the Institution of Civil Engineers.—His brother, STUART RENDEL, Lord of Hatchlands, likewise a civil engineer; born in 1834; was educated at Oxford, and was called to the bar in 1861; a member of the Armstrong and Whitworth committee for experiments in artillery (1861-63), and became a member of the Armstrong firm in 1870. In 1880 Mr. Rendel was sent to Parliament, where he was continually until 1894; in 1886 was chosen first president of the North Wales Liberal Federation; and in 1887 first president of the Welsh National Council. In 1894, on Gladstone's retirement from office, Rendel was created Baron of Hatchlands. His chief engineering-works were in connection with the harbors of refuge at Holyhead and Portland.

RENO, a city and the capital of Washoe County, northwestern Nevada, 17 miles N.N.W. of Virginia City, on the Southern Pacific, the Carson and Colorado, the Virginia and Truckee, and the Nevada-California-Oregon railroads, and on the Truckee River. It is an agricultural and mining region, and has a considerable trade. Located here are a high school, two public libraries, a national bank with a capital of \$200,000, the Bishop Whitaker School for Girls and Nevada State University. The last is a non-sectarian, co-educational institution, founded in 1886, which, in 1896, had 21 instructors, 304 students, and 4,000 volumes in its library. Population 1880, 1,302; 1890, 3,563.

RENO, JESSE LEE, an American soldier; born in Wheeling, West Virginia, June 20, 1823, and graduated at West Point in 1846. He served in the Mexican War, participating in the siege of Vera Cruz, and all the leading battles of the campaign, during which he was promoted to lieutenant and captain. In 1849 he became professor of mathematics at the United States Military Academy, and was in charge of the arsenal at Mount Vernon, Alabama, when it was seized by the Confederates (1861). During the Civil War he commanded a brigade in Burnside's army on its march into North Carolina, and was present at the assault upon Roanoke Island, also in the battles of Camden and Newbern. In the fall of 1862 he was promoted to be major-general of volunteers, and participated in the second battle of the Bull Run and at Chantilly. He was killed while leading the Ninth Army Corps at the battle of South Mountain, Sept. 14, 1862.

RENOUF, ÉMILE, a French painter; born in Paris,

June 23, 1845. He was a pupil of Carolus Duran and Lefebvre; exhibited first at the Salon in 1872; devoted himself to *genre*, landscape and marine pictures, and was fortunate in portraying his subjects with much truth. His works include *Tourne donc, Mousse!* (1876); *Dernier Radoub, "Mon Pauvre Ami"* (1879); *La Neuve-île de Scin* (1880); *Un Coup de Mer* (1885); *Les Guetteurs* (1888); and *Une Partie de Cartes* (1892). He received a first-class medal at the Paris Exposition (1889), and the cross of the Legion of Honor in the same year.

RENOUF, PETER LE PAGE, a British Orientalist; born in the Isle of Guernsey, Great Britain, in 1824; received his early education in Elizabeth College there, and afterward became a scholar of Pembroke College, Oxford. At Easter, 1842, he became a member of the Roman Catholic Church. On the opening of the Catholic University of Ireland, in 1855 he was appointed by Doctor Newman professor in that institution, where he filled the chairs of ancient history and Eastern languages. In 1864 he became one of the inspectors of schools, and he has continued to hold that appointment. While at the Catholic University he was one of the editors of the *Atlantis* and of the *Home and Foreign Review*, and contributed to other periodicals. Some of his papers were published in the *Transactions of the Society of Biblical Archaeology*. In 1885 he was appointed to succeed Dr. Samuel Birch as keeper of Egyptian antiquities at the British Museum; retired in 1891. He died in October, 1897.

RENOVO, a borough of Clinton County, central Pennsylvania, 41 miles N.W. of Lock Haven, on the west branch of the Susquehanna, and on the Pennsylvania railroad. The railroad has large machine-shops here, which employ one thousand men. The borough has also lumber-mills, being in a large tract of pine forest, and lumbering and coal-mining are the principal industries. Its picturesque situation, surrounded as it is by wooded mountains, rising in all directions to a height of about 1,000 feet, makes it popular as a summer and tourists' resort. Population 1890, 4,154.

RENSELAER, a town and the capital of Jackson County, northwestern Indiana, 40 miles N.N.W. of Lafayette; on the Iroquois River, and on the Louisville, New Albany and Chicago railroad. It is in a farming, dairying and stock-raising region, and has manufactories of flour, cigars and lumber. Corn and oats are shipped extensively. It is the seat of St. Joseph's (Roman Catholic) Normal Indian School. Population 1890, 1,455.

RENSELAER POLYTECHNICAL INSTITUTE, a school founded in Troy, New York, in 1824, by Stephen Van Rensselaer for the teaching of theoretical and practical science. It was reorganized in 1849 on the basis of a general polytechnic institute. There are three buildings given up to lectures, museums and laboratories and a large gymnasium. The course in civil-engineering has been supplemented since 1885 by a course in general science. There are 18 instructors, some 160 students and the library contains over 5,000 volumes. The school is non-sectarian, and is supported by its dues and fees, the annual tuition being \$200. See also TECHNICAL SCHOOLS, in these Supplements.

RENWICK, JAMES, an English scientist; born in Liverpool, May 30, 1790, and removing to America with his parents, graduated at Columbia College in 1807. He became instructor in chemistry at that institution about 1813, and in 1820 was appointed professor of chemistry and experimental philosophy, being made professor *emeritus* in 1833. He also served in the engineer corps of the United States army, and was a member of the commission appointed by the government to determine the boundary line between the United States and the British possessions. He was a regular contributor to the *American Quarterly Review* and other periodicals, and edited publications on scientific and mechanical subjects. Among his publications are *Outlines of Natural Philosophy* (1822); *Elements of Mechanics* (1832); *Outlines of Geology* (1838); and a *Treatise on the Steam-Engine*. He died June 12, 1863.—His son, HENRY BREVOORT RENWICK, a civil engineer; born in New York City, Sept. 4, 1817; graduated at Columbia in 1836; after engaging in business, took up the study of engineering; became assistant engineer in the United States service; was astronomer in the boundary commission of 1840-42; in 1848 was appointed examiner in the United States patent-office; in 1853, inspector of steamboat-engines at New York; after his retirement was a consulting-engineer, and was considered one of the first authorities in the country. He died Jan. 27, 1895.—Another son, JAMES RENWICK, an architect; born in Bloomingdale, New York, Nov. 3, 1818; was a graduate of Columbia College; engaged first in civil-engineering, and later in architecture; was assistant on the Croton aqueduct, and afterward gained a reputation from the buildings designed by him. Among them are Grace Church, New York; Smithsonian Institution, Washington, District of Columbia; the Roman Catholic Cathedral, Fifth Avenue, New York; Vassar College buildings, and the new front to the New York Stock Exchange. He died June 23, 1895.

REORGANIZED CHURCH OF LATTER-DAY SAINTS. See LATTER-DAY SAINTS, in these Supplements.

REPHAIM. See BASHAN, Vol. III, p. 410.

REPLENISHER. See ELECTROMETER, Vol. VIII, p. 120.

REPOUSSÉ. See METAL-WORK, Vol. XVI, pp. 72, 73; PLATE, Vol. XIX, p. 179.

REPRESENTATIVE GOVERNMENT. See GOVERNMENT, Vol. XI, pp. 12-14.

REPRODUCTION, ANIMAL. See EMBRYOLOGY, in these Supplements.

REPRODUCTION, in plants, from the standpoint of morphology, has already been considered under MORPHOLOGY, in these Supplements. It only remains to consider it from the physiological standpoint. The fundamental fact of reproduction is the separation from the parent body of a mass of protoplasm which is capable of developing a new organism. Several kinds of reproduction are recognized, but all are reducible to the above statement. As with all other plant-functions, a certain power of reproduction is retained by all cells not highly specialized, certainly by all cells of primitive struc-

ture. Owing to this fact, reproduction by "vegetative multiplication" is common; that is, certain portions of the vegetative body, under suitable conditions, can develop a complete organism. The simplest form of vegetative multiplication is seen in those one-celled plants which multiply by cell-division. In the case of multicellular plants, this process would result simply in the growth of the body; but in these plants vegetative multiplication is secured by the separation of certain portions of the body, as the dying away of a main axis and the isolation of branches, each of which can reproduce the complete organism, the formation of buds of various kinds, tubers, etc. The power of vegetative multiplication is evident even in the highest plants, which can be propagated by grafts, cuttings, etc., in some cases even every smallest fragment of the parent body being able to produce a complete organism. The power of vegetative multiplication, while generally diffused, often becomes specialized in distinct organs, such as the "geminae" of certain liverworts and other groups. As the transition from general to specialized vegetative multiplication is gradual, so is the transition from the specialized organs for vegetative multiplication to the specialized cells known as "spores."

As distinguished from reproduction by vegetative multiplication, the other phase of reproduction is that by spores. A spore is a single cell specialized for reproduction, and represents the highest degree of differentiation of the reproductive power. Two kinds of spores are recognized, differing from each other, not in their power of reproduction, but in their origin. One, the *asexual spore*, is formed by the ordinary processes of cell-division; the other, the *sexual spore*, is formed by the union of two sexual cells, known as *gametes*. Asexual spores are produced by almost all plants, while sexual spores are wanting among the lowest plants, and also among certain high plants (such as the higher fungi) in which sexuality has been lost through degeneracy. Asexual spores are developed either within a special cell, the sporangium, or by the abstraction of certain specialized branches. It is a notable fact that when sexual spores appear, both they and the asexual spores continue, among Thallophytes, to be produced by the same plant body. Among those higher Thallophytes in which alternation of generations becomes apparent, and a sporophyte is developed which produces asexual spores, the gametophyte still retains its power of producing asexual as well as sexual spores. In such cases three sets of spores appear in the life-history of the plant; viz., the sexual spores of the gametophyte, and the asexual spores of the gametophyte and sporophyte. These two kinds of asexual spores differ from each other in this regard; that the gametophyte spore reproduces its parent plant, the gametophyte; while the sporophyte spore produces, not another sporophyte, but the antithetic generation, the gametophyte. This difference becomes a striking resemblance, however, by stating that asexual spores always produce gametophytes, and sexual spores produce only sporophytes. In groups higher than the Thallophytes (Bryophytes,

Pteridophytes and Spermatophytes), in which alternation of generations becomes very distinct, the gametophyte has lost its power of producing asexual spores, which are confined strictly to the sporophyte.

In the case of sexual reproduction, the preparation of the spore is more complex. Two sexual cells, the gametes, are developed, having originally been derived from motile asexual spores (zoöspores), and by their fusion (called *conjugation* if the gametes are similar, and *fertilization* if they are dissimilar) form the spore (*zygospore* or *oöspore*). The gradual transition from zoöspores to gametes, and the differentiation of similar gametes into very dissimilar ones (*oöspores* and *spermatozooids*), have been discussed under MORPHOLOGY, in these Supplements. The process of fertilization is as follows: The male gamete, by its own activity, or more passively conducted, is brought into the neighborhood of the female gamete. In case the male gamete is a spermatozoid (free-swimming), as in Algae, Bryophytes and Pteridophytes, the act of fertilization is connected with aquatic conditions, and the free-swimming gamete is observed to be attracted to the oöspore by a certain substance secreted by the female organ, and diffused through the water. In mosses this substance is found to be cane sugar; in ferns, a salt of malic acid. In heterosporous plants the approach is usually different, the aquatic conditions being absent, and the male gamete not being developed into a spermatozoid. In such cases the gamete is conducted to the oöspore through a specially developed tube. Another preparatory process which should be noted is "the reduction of chromosomes." The nucleus of all cells is found to consist partly of a denser substance, which assumes the form of a delicate thread or filament. As this substance stains readily, it has been called *chromatin*. The chromatin filament, in the resting stage of the nucleus, appears as a continuous coiled thread. In cell-division, however, the thread breaks up into a definite number of parts, called *chromosomes*. The number of chromosomes is constant in each kind of plant; if it be eight, that number appears in every cell, the process of cell-division carefully dividing each chromosome of the parent nucleus. By the union of gametes, however, the number of chromosomes in the resulting spore is doubled, and this doubled number appears in all the cells of the sporophyte derived from the oöspore. It is evident that this would lead eventually to an indefinite multiplication of chromosomes. The provision against this result is the process of "reduction of chromosomes." This has been observed carefully in the higher plants, in which there is distinct alternation of generations, and is as follows: In the case of a sporophyte whose nuclei contain sixteen chromosomes, in the division of the mother-cells for the purpose of producing the asexual spores the reduction of chromosomes by one half occurs, so that the nuclei of the asexual spores contain but half the number of chromosomes possessed by all the cells of the sporophyte,—that is, 8 instead of 16. This sudden reduction is described as due to the fusion of

chromosomes in pairs. As the asexual spore, with its eight chromosomes, produces the gametophyte, the number eight will appear in all the cells of the gametophyte, among which are the gametes. The two gametes, therefore, approach each other with the reduced number of chromosomes, and by their coalescence produce a cell, the oöspore, in which the number of chromosomes is restored to 16. The oöspore developing the sporophyte, the number 16 appears in all the cells of the sporophyte, to be reduced suddenly again upon the formation of the asexual spores.

The two gametes, having been brought into contact as described above, begin to fuse part with part, cytoplasm with cytoplasm, centrosphere with centrosphere, and nucleus with nucleus, the chromosomes of the two gametes, however, remaining distinct. The chromosomes do not fuse throughout the whole history of the sporophyte, which results from the oöspore, until with the formation of the asexual spores they suddenly fuse, and the reduced number appears. The first evident result of fertilization is the formation of a cell-wall about the fused product, thus completing the structure of the oöspore. Two series of results follow: 1. The formation of the embryo from the oöspore by cell-division; and 2. Changes, more or less extensive, in neighboring structures not directly concerned in the act of fertilization. These changes result in the formation of the structure known as "the fruit," which thus has a physiological rather than a morphological significance.

The chromosomes are supposed to be the material carriers of hereditary characters, and are observed to be an aggregation of very minute disks that have been called *ids*. In the case of sexual reproduction, two sets of chromosomes, with their numerous *ids*, carrying two sets of hereditary characters derived from long lines of ancestors, unite, making a combination which, in the very nature of things, cannot often be duplicated. Consequently, sexual reproduction is looked upon as a prolific source of variation.

Probably the most difficult problem of heredity connected with plants is to be found in the fact of alternation of generations, in which spores do not reproduce the parent form, but a very dissimilar structure. A suggested explanation is that this phenomenon may be accounted for by the fact that in fertilization the two sets of chromosomes do not fuse, the result being a structure (the sporophyte) unlike the parent form; but when they do fuse in the production of asexual spores, these spores reproduce the original form (the gametophyte).

Connected with the subject of reproduction is that of sexual affinity. Gametes which enter into sexual union are produced usually by the same species, but the possibility of the union of gametes of different specific origin is witnessed by the production of hybrids,—a phenomenon very common among plants. The possible range of hybridization has not been determined, but it varies widely in different groups of plants, some hybridizing extensively, others apparently not at all. In the groups which hybridize, species of the same genus cross freely, and some-

times species of different genera, but whether a wider range of crossing is possible remains to be discovered.

JOHN M. COULTER.

REPÚBLICA MAYOR DE CENTRO AMERICA, the title under which the three American republics of Honduras, Nicaragua and San Salvador formed a confederation by the treaty of Amalpa, ratified in 1896. See HONDURAS, NICARAGUA and SAN SALVADOR, in these Supplements.

REPUBLICAN PARTY. The Republican party, at the time of its origin, 1854, was an amalgamation of little parties and factions, which, in the course of twenty years, had been split from the Whigs and Democrats by the various phases of the slavery question. One element was the Free-Soil party, which furnished such leaders as Julian, John P. Hale, Charles Sumner, Wilmot, Francis P. Blair and Charles Francis Adams. Another was that faction of the Whigs which refused to accept the Fugitive Slave Law or indorse the Compromise of 1850, and was represented by Abraham Lincoln, William H. Seward, Horace Greeley, Henry Wilson, Thaddeus Stevens, John Sherman, William L. Dayton and William Pitt Fessenden. A third part was contributed by the Know-Nothings, led by Nathaniel P. Banks, Schuyler Colfax and Henry Winter Davis. A fourth part came from the Democrats, under Hannibal Hamlin of Maine, Simon Cameron of Pennsylvania, Gideon Wells of Connecticut, William Cullen Bryant and Montgomery Blair. Finally, there was a contingent of War Democrats, who joined it after secession began, and, in many instances, drifted away in the days of reconstruction. Such men were Andrew Johnson, John A. Dix, John A. Logan, John Cochrane, Daniel E. Sickles, Benjamin F. Butler and Edwin M. Stanton.

The political factions these men led had little in common, save a strong determination not to see the territories, and especially those north of the "thirty-six-thirty" line, opened to slavery. When, therefore, the Kansas-Nebraska Bill was before Congress in 1854, forgetting all differences, and remembering only the common cause, they united, and, under the name of "Anti-Nebraska men," fought for the freedom of the territories. But what took place in Congress had already taken place all over the North. Everywhere, in 1854, Whigs and Free-Soilers and Democrats were holding conferences and state conventions and forming "fusion tickets," and naming the new party. Just when the name *Republican* was applied cannot be determined. It was used at a conference at Ripon (Wisconsin) in March, and at a conference of Anti-Nebraska Congressmen in May, and by state conventions in Michigan, Maine, Ohio, Indiana, Illinois and Iowa. Success attended the party from the start, and at the elections of 1854 it carried 15 out of 31 states, secured 11 Senators and a plurality of the House of Representatives. This was so encouraging that in December, 1855, the state committees of Maine, Vermont, Massachusetts, New York, Pennsylvania, Ohio, Michigan, Indiana and Wisconsin issued a call for a convention at Pittsburgh, Feb. 22, 1856, where the national organization of the party was completed. A national con-

mittee was elected and a nominating convention summoned to meet at Philadelphia, June 17, 1856.

The platform then adopted declared against the repeal of the Missouri Compromise, against the extension of slavery into the free territories, and called for the admission of Kansas as a free state, and for a railroad to the Pacific. The candidates were John C. Frémont, a Free-Soiler, and William L. Dayton, an Old Whig, and with the rallying cry, "Free soil, free speech, free men, Frémont," the party entered the campaign, and was defeated, but elected 92 out of 237 Congressmen. The Dred Scott decision, the Lecompton Bill, and the breaking up of the Know-Nothings in the course of the next two years, added thousands to its membership, and in 1860 its candidates, Abraham Lincoln and Hannibal Hamlin, were elected. The Republicans then stood for a homestead law, a protective tariff, a river and harbor bill, a railroad to the Pacific, and all the other principles they declared for in 1856. The events of the war threatened for a time to split the party, and in 1864 the radical element went so far as to hold a convention at Cleveland and nominate Frémont and General John Cochrane of New York, the popular Irish leader. But taking, temporarily, the name of National Union Party, the Republicans nominated Lincoln and Andrew Johnson, a War Democrat, and in their platform indorsed the prosecution of the war for the Union, the emancipation proclamation, the Thirteenth Amendment, the redemption of the debt, and the enforcement of the Monroe doctrine in Mexico. The death of Lincoln, following hard upon his inauguration, put Johnson in the chair, and the long quarrel over reconstruction began. The Civil Rights Bill, the Freedmen's Bureau Bill, the Fourteenth Amendment, the Reconstruction Bill, and the Tenure of Office Act were passed, many of them over the veto, and Johnson was impeached, tried, and not found guilty.

In 1868, U. S. Grant and Schuyler Colfax were nominated and elected, and on their appearance a new era began in the party history. Most of the old leaders, Lincoln, Seward, Chase, and Wells, were gone; a new generation, represented by Blaine, Conkling, Sherman, Edmunds, and a host of others, was in control, and to it fell the task of dealing with the evils which sprang from reconstruction and the enfranchisement of the negro. This the party did by coercive legislation and vigorous executive action. The legislation comprises the Fifteenth Amendment, the "Kuklux Act" (April 20, 1871), or so-called "Force Bill." The executive measures were the proclamations of Grant, under the "Kuklux Act," suspending the writ of *habeas corpus* in certain counties of South Carolina.

The result of this legislation, and of the scandals (such as the Crédit Mobilier, the whisky frauds and the Louisiana outrages), was the Republican "bolt" (1870-72), and the formation of the Liberal Republican party, demanding general amnesty to rebels, civil service reform, local self-government for the states lately in rebellion, no more land grants to corporations, and a return to specie payments. Though the loss of this wing was serious, the party was not crippled, and in 1872 re-elected

Grant over Greeley (the candidate of the combined Democratic and Liberal Republican parties) by an immense majority.

With the second inauguration of Grant the war issues began rapidly to disappear and financial questions to take their place. The Democrats demanded more paper, and the payment of the debt in paper money. The Republicans demanded a speedy return to specie payment, and as a first step toward this had begun to contract the legal-tender currency in Johnson's administration. But the West cried out so vigorously that it was stopped, and not till Jan. 14, 1875, was an act passed providing for a resumption of specie payments on a certain day. The day chosen was Jan. 1, 1879. Meantime silver had been demonetized (Feb. 12, 1873), and as this made gold the only coin in which bonds could be paid, the idea spread that it was a scheme to give bondholders more than they deserved, as many had paid for their bonds in paper. In 1878, therefore, Congress passed the Bland Silver Bill, which Hayes vetoed, and which Congress, by great majorities (Feb. 28, 1878), passed over the veto.

Hayes and Wheeler were nominated at Cincinnati in June, 1876, and after a close contest at the polls were declared duly elected by the Electoral Commission (March, 1877). In 1880 a desperate effort was made by three Republican "bosses," Logan, Conkling and Cameron, to nominate Grant for a third term. This caused a convention of anti-third-term Republicans to be held at St. Louis, where resolutions condemning the idea were passed. But the idea would not down, and in the national convention at Chicago the vote for Grant was never less than 302, and twice rose to 312. The vote for Blaine was equally solid. The result was the union of all anti-third-term men on James A. Garfield and Chester A. Arthur.

The issues in 1880 were tariff, civil service, polygamy and restriction of Chinese immigration. The assassination of Garfield by Guiteau (July 3, 1881) put Arthur in the chair. The memorable acts of his term of office were the reduction of the postage, the tariff of 1883, the Civil Service Reform Act, the American Shipping Act, the law increasing pensions, suspension of Chinese immigration for ten years, and the retirement of the trade dollar.

The nomination, in 1884, of James G. Blaine and John A. Logan was followed immediately by the revolt of such Republicans as opposed the political principles and methods for which Blaine stood, by the formation of the Independent, or "Mugwump," party and by the election of Grover Cleveland.

For the first time in 24 years the Republican party lost the Presidency, and, though it was regained in 1888 by the election of Benjamin Harrison and Levi P. Morton, it was lost again in 1892 by the re-election of Grover Cleveland. The memorable acts of Harrison's term are the McKinley tariff, the Silver Bill, the Original Package Law, the Immigration Law, that providing for international copyright, and the Chinese Exclusion Law. In 1892 Harrison and Whitelaw Reid were the candidates, nominated by a convention at Minneapolis, June 7th. The platform called for protection, bimetalism, admission of

the territories, the cession of arid lands to the states and antitrust legislation.

Though defeated at this election, the party was successful at the next Congressional election in the autumn of 1894, and regained the House by a great majority. In June, 1896, William McKinley and G. A. Hobart of New Jersey were nominated for the Presidency and Vice-Presidency at St. Louis, on a platform declaring for the gold standard, a protective tariff, the Monroe doctrine, reciprocity treaties, restricted immigration and Cuban independence. On the 3d of November they were chosen by the popular vote for electors, having carried, among others, every state from Iowa to the Atlantic north of the Ohio and Potomac rivers.

J. B. McMASTER.

REPUBLICAN PARTY, FIRST. See DEMOCRATIC PARTY, in these Supplements.

REQUISITION, the act of demanding that an act be done which the person making the requisition has a right to demand. A requisition of title is a written inquiry made by one contemplating the purchase of land, or his solicitor, and directed to the owner thereof, in regard to some apparent insufficiency in the title. The most familiar use of the term is the demand of the governor of one state made upon the governor of another state for the return of a fugitive from justice under the provisions of the United States constitution, which provisions generally are supplemented by state laws enacted in harmony therewith. See also EXTRADITION, in these Supplements.

RESACA, a village of Gordon County, Georgia. It was here that on May 14 and 15, 1864, Sherman fought one of the first battles of his celebrated Georgia campaign. Knowing that General Johnston was marching toward Resaca, Sherman dispatched McPherson to cut off his supplies by the railroad, and also to prevent Johnston from gaining this desirable position. McPherson, however, was unsuccessful. As soon as Sherman heard of this failure he himself marched on to Resaca, and on the 14th skirmishing and artillery fire continued all day. On the following day, McPherson gained an elevated position which enabled him to destroy the railroad bridge over the Oostenaula River. Johnston tried in vain to dislodge him, but, finding himself unable to do so, and being close pressed by Sherman and Hooker, retreated on the night of the 15th.

RESACA DE LA PALMA, a noted battle-field of Texas, in Cameron County, about four miles N. of Brownsville. On the 9th of May, 1846, six thousand Mexicans under General Arista were defeated with great loss by two thousand Americans under General Zachary Taylor.

RESCISSION, a term in use in respect to contracts, and means an annulment or refusal to perform the contract. A contract may generally be rescinded by mutual consent of the parties, by reason of the failure of one party to perform his part thereof, or on account of fraud of one of the parties. As a rule, a contract may not be re-

scinded by one party unless both parties can be placed in the same situation as they occupied before the contract was made. A very common cause for the rescission of a contract is that of fraud. When a contract is vitiated by fraud, the defrauded party may himself rescind the contract, or he may apply to a court of equity to have the contract annulled. The latter remedy is resorted to in case of real estate contracts, and other similar transactions, wherein it is desired to have the contract judicially canceled so as to avoid harassment in the future because of loss of evidence, etc., or to remove a cloud from the title to real estate. In case of a mere sale of personal property, the vendor who has delivered the goods because of fraudulent representations usually himself rescinds the contract without resorting to a court of equity, and takes possession of the property by replevin, or otherwise. This method affords a speedy remedy, and when the chief element of title is possession, as in case of personal property, it is fully as effective as a judicial rescission. A contract may also be rescinded because of a mistake of fact on the part of the parties thereto. See also DECEIT; FALSE PRETENSES; IGNORANTIA FACTI; and IGNORANTIA JURIS, in these Supplements.

RESERVATION SYSTEM. See INDIAN AFFAIRS, in these Supplements.

RESERVOIR DAMS. See WATER-SUPPLY, Vol. XXIV, p. 406.

RES GESTÆ, the subject-matter of a transaction, and includes the facts which surround the transaction so as to be a part thereof. The term is used chiefly in connection with a rule of evidence to the effect that evidence of statements, conversations or acts can be received only when such statements, conversations or acts are a part or the *res gestæ* of the controversy.

RESHD. See RASHT, Vol. XX, pp. 285, 286.

RESHID PASHA, a Turkish prime minister (1802-58). See TURKEY, Vol. XXIII, p. 651.

RESILIENCE. See ELASTICITY, Vol. VII, p. 808.

RESISTANCE. See ELECTRICITY, §§ 43, 45, 46, in these Supplements.

RESONANCE, ELECTRICAL. See ELECTRICITY, § 91, in these Supplements.

RESPIRATION, in botany, is applied to that phase of destructive metabolism (catabolism) which involves a gaseous interchange between the plant and the air, the plant absorbing oxygen and giving off carbonic dioxide.

RESPIRATORY SYSTEM. See RESPIRATION, Vol. XX, pp. 474-486.

RESPONDENTIA BOND. See BOTTOMRY, Vol. IV, p. 168.

RESTIGOUCHE, a river. See NEW BRUNSWICK, Vol. XVII, p. 373.

RESURRECTION. See ESCHATOLOGY, Vol. VIII, pp. 534-538; GOSPELS, Vol. X, pp. 805, 811, 840, 841.

RESURRECTION-PLANT, a popular name given to certain species of *Selaginella*, one of the genera of club mosses (*Lycopodina*), which exhibit

strong hygroscopic properties. The most common species is *S. lepidophylla*, from Lower California and Mexico. It is a nest-like ball when dry, hence often called bird's-nest moss, but when moist unfolds and displays its dense, fern-like branches.

RESUSCITATION OR ARTIFICIAL RESPIRATION. See DROWNING, Vol. VII, pp. 475, 476.

RESZKE, EDOUARD and JEAN DE. See DE RESZKE, in these Supplements.

RETENE, a hydrocarbon ($C^{18}H^{18}$) found in some bitumens and in fossil pine stems. It is produced in the distillation of wood and on passing acetylene through a red-hot tube. It forms white flakes, soluble in alcohol, ether and carbon-disulphide; melts at $98^{\circ}5$ and boils at 390° .

RETENTION OF URINE. See VESICAL DISEASES, Vol. XXIV, p. 191.

RETICULARIA. See PROTOZOA, Vol. XIX, p. 845.

RETINA. See EVE, Vol. VIII, pp. 816-823.

RETRIEVER. As the name implies, the retriever is a breed of dog trained to find out and bring back any killed or wounded game. The work of the retriever was long done by various breeds of dogs, such as the pointer, setter or spaniel, but, in addition to its spoiling these dogs for their regular work, they were found to be too hard-mouthed,—the worst fault possible in a retriever, as he wastes more in game injured than would have been lost without him. Crosses with the Newfoundland were tried, and gradually two kinds of retriever were introduced. One variety, known as wavy-coated, was probably the result of a cross with the setter; and the other, known as curly-coated, is from the water-spaniel or poodle. Not much attention was paid to the retriever until the introduction of dog-shows, about 1850, but since that time the breed has been kept free from any fresh cross, with a great improvement in the appearance. The two varieties of retriever differ only in coat; the curly coat should curl closely and firmly all over the body, the wavy coat should fall straight and thick. An intelligent large head, with a full clear eye, should always be seen in the retriever. Legs and feet need to be large and strong. The retriever should not be too small, as it needs a powerful dog to retrieve a hare successfully. The retriever makes a very good watch-dog, and numberless bad specimens of the breed are to be found fulfilling this vocation only. The pure retriever is gentle in temper and easy to command.

RETTING. See FLAX, Vol. IX, pp. 294-296.

REUSS, a river. See SWITZERLAND, Vol. XXII, p. 776.

REUSS, EDOUARD GUILLAUME EUGÈNE, a German theologian; born in Strasburg, Germany, July 18, 1804. He studied at Göttingen, at Halle under Gesenius, at Paris under Silvestre de Sacy, and at Strasburg. From 1829 he was a professor of theology in Strasburg until his retirement on a pension in 1888. He was a prominent champion of the liberal school of Protestant theology, and

wrote a number of works on theology. Among them are *History of the Books of the New Testament* (1842); *History of the Books of the Old Testament* (1881); *Histoire du Canon des Saintes Écritures dans l'Église Chrétienne* (1863); and a translation of the Bible, with commentaries. He died May 12, 1891. See also PENTATEUCH, Vol. XVIII, p. 508, note.

REUTER, BARON PAUL JULIUS, a German telegraph promoter; born in Cassel, July 21, 1821. He became connected with the electric telegraph from its earliest beginnings, and was a promoter of the continental system in Europe; started the first new's agency in Aix-la-Chapelle. In 1851 the headquarters of the agency were removed to London, and since then it has grown so as to include all parts of the civilized world. He obtained a concession from the Hanoverian government, in 1865, for a submarine cable between England and Germany, and in 1869 a like privilege from France for a cable between the United States and France; received an exclusive concession in 1872 from the Persian government for the construction of railways and working of mines, forests and making use of all natural resources of the country, but it was annulled in 1889, and in place of it he received the concession of the Imperial Bank of Persia.

REVELATION. See APOLOGETICS, Vol. II, pp. 189-193; INSPIRATION, Vol. XIII, pp. 154-157; and PROPHET, Vol. XIX, pp. 814-823.

REVENUE. See FINANCE, Vol. IX, pp. 171-191.

REVERE, PAUL, an American patriot; born in Boston, Jan. 1, 1735. He took part in the campaign on Lake George in 1756; on his return to Boston took up the trade of a goldsmith and practiced copper-plate engraving; produced numerous plates illustrating or caricaturing events of the times; was sent to Philadelphia to learn how to make powder, which he succeeded in doing, and established a mill in Massachusetts. He was a member of the Boston Tea-Party; a member of an organization for watching the movements of the British; and on April 18, 1775, took the ride to Lexington which Longfellow has made so famous. When the war broke out he entered the army, and was a trusted messenger until he became a regular officer in the artillery. After the war he established the Revere Copper Company, which was the first company to refine and roll copper in America, and which still carries on the business. He laid the corner-stone of the Massachusetts State House in 1795, and was the founder of the Charitable Mechanics Association. He died May 10, 1818.

REVERSION OR ATAVISM. See BREEDS AND BREEDING, Vol. IV, p. 247.

REVERISON, in law. See REMAINDER, Vol. XX, pp. 372, 373.

REVILLE, ALBERT, a French Protestant writer and clergyman; born in Dieppe, Nov. 4, 1826. He contributed to the most important French Protestant organs, and by his writings took a prominent position among his co-religionists. For some months he was suffragan at Nîmes, then

pastor at Luneray, near Dieppe, and in 1851 he was called to Rotterdam as pastor of the Walloon Church. In 1862 the University of Leyden conferred upon him the degree of doctor; in 1880 he was appointed titular professor of religious history in the College of France, and in 1886 he accepted the presidency of the Section des Sciences Religieuses at the Sorbonne. Among his later works are *Les Religions des Peuples Non-civilisés* (1883); *Les Religions du Mexique, de l'Amérique Centrale et du Pérou* (1886); *La Religion Chinoise* (1889). M. Réville was one of the chief leaders of the liberal movement among the French Protestants.

REVISION OF THE BIBLE, changes made necessary by change of language and advance of knowledge. The body appointed in 1870 was divided into two parts, one of which worked on the New and the other on the Old Testament. They met once a month in London, and co-operated with a like body in America, which met once a month in New York. The whole body consisted of 79 members, 52 in England and 27 in the United States. The revised New Testament was published in 1881, and the revised Old Testament in 1885. See also **ENGLISH BIBLE**, Vol. VIII, pp. 389-390.

REVOLUTIONARY SOCIETIES. See **COLONIAL SOCIETIES**, and **GENEALOGIES, AMERICAN**, in these Supplements.

REVOLUTIONARY WAR, AMERICAN. See **UNITED STATES**, Vol. XXIII, pp. 739-744.

REVOLVER, a firearm similar to the pistol, but having a chambered cylinder between the barrel and the breech-mechanism, each chamber carrying a cartridge, so that it can be fired, without reloading, as many times as there are chambers. Each motion of the trigger brings a chamber into line with the barrel, so that its cartridge may be discharged at the next pull on the trigger. Numerous patents for this principle have been taken out, an American by the name of Elisha H. Collier patenting such a weapon in the United States and England about 1818. In 1835 Colonel Samuel Colt patented his famous revolver. The most recent improvement is known as the hammerless revolver, because it has a concealed hammer that cannot be caught by accident, causing the unintentional discharge of the piece. The trigger cannot be pulled unless at the same time a pressure is applied to a safety-latch which releases the internal hammer. The object of the arrangement is to render the revolver absolutely secure against accidental discharge in the pocket. See also **GUN-MAKING**, Vol. XI, p. 285; **COLT, SAMUEL**, Vol. VI, p. 166; and *Revolvers and Pistols*, under **GUN-MAKING**, in these Supplements.

REWARD, a sum of money or other thing of value in the nature of a premium paid to a person for the performance of some special or extraordinary service. A reward may be offered by the government, or by a private person. If offered by the government it is a premium usually consisting of a sum of money to be paid by authority of law for the performance of some act for the

public good. If by a private person, it is for the performance of some special service of value, chiefly to the person making the offer. A reward is governed in character by the nature of the service desired, rather than by the amount of labor or skill required in performing it, and differs widely from ordinary payment or compensation. It is usually governed by the desirability of accomplishing the purpose, and the amount of work involved has little to do with fixing the amount of a reward. Rewards are usually offered to the public in general, in the hope that some one may be found who, through accident or good fortune, may be able to perform the service. They are frequently offered by the government in the case of escaped criminals, but usually only upon the condition that the accused when taken shall be finally convicted. The publication of an offer of reward is a general offer, and the person who accepts it by doing the act desired is entitled to the reward and can sue for its recovery. Rewards are frequently offered by private persons for the return of lost property, and if the finder acts upon the knowledge that a reward has been offered he is entitled to claim it. One who is entitled to receive a reward upon the conviction of a criminal may still be a competent witness against the accused, in the absence of a statute to the contrary.

REYER, ERNEST, a French musical composer, whose real name was Rey; born in Marseilles, Dec. 1, 1823. At the age of 16 he went to Algiers as a government official, and continued his pianoforte practice and began to compose. His compositions became popular, and in 1848, when the Revolution deprived him of his situation, he returned to Paris and completed his musical education under his aunt, Madame Louise Farrenc. He composed the music for several successful operas, among them being *Le Selam*; *Maitre Wolfram*; *Sacountala*; and *Victoire*. M. Reyer wrote for the *Presse*, the *Revue de Paris* and *Courrier de Paris*; and after the death of Berlioz, he became musical critic to the *Journal des Débats*.

REYKJAVIK. See **ICELAND**, Vol. XII, p. 619.

REYNARD THE FOX. See **FABLE**, Vol. VIII, pp. 838, 839.

REYNOLDS, SIR J. RUSSELL, an English physician; born in Romsey in 1828. He was educated at University College, London, and the University of London; was elected fellow of University College in 1856, of the Royal College of Physicians in 1859, and of the Royal Society in 1869; was appointed professor of principles and practice of medicine in University College in 1865; member of the council in 1888; was *emeritus* professor of medicine in University College, and consulting-physician to University College Hospital, and from 1878 until his death physician in ordinary to the Queen's household. He wrote *Essay on Vertigo* (1854); *Diagnosis of Diseases of the Brain, Spinal Cord and Nerves*; *Facts and Laws of Life* (1859); and *Lectures on the Clinical Uses of Electricity* (1871); besides numerous magazine articles and lectures; he was made a baronet in 1895; was president of the Royal

College of Physicians, and in 1895 president of the British Medical Association. He died May 29, 1896.

REYNOLDS, JOHN FULTON, an American soldier; born in Lancaster, Pennsylvania, in 1820.



GEN. J. F. REYNOLDS.

He was graduated at West Point in 1841, and was commissioned first lieutenant in 1846. He served in the Mexican War, against the Rogue River Indians, in the Utah expedition, and in 1859 became commandant at West Point. On the outbreak of the Civil War he was appointed lieutenant-colonel, and was soon promoted brigadier-general of volunteers. He took part in the campaigns of the Army of the Potomac, during which he was taken prisoner, but soon exchanged, and it was due to him that at second Bull Run the Union army was saved from a disastrous rout. He was promoted major-general of volunteers in 1862, and succeeded Hooker in command of the First Army Corps. On the first day of the battle of Gettysburg he was struck by a rifle-ball, which caused instant death July 1, 1863. Several monuments have been erected to his memory, one of which stands on the spot on which he met his death.

REZONVILLE, BATTLE OF. See GRAVELOTTÉ, in these Supplements.

RHACHITIS, the technical name for RICKETS, Vol. XX, p. 548.

RHÆTO-ROMANIC DIALECTS, same as LADINO. See ROMANCE LANGUAGES, Vol. XX, p. 668.

RHAMPHASTIDÆ OR RAMPHESTES. See TOUCAN, Vol. XXIII, pp. 476-478.

RHAPSODISTS. See GREECE, Vol. XI, p. 137.

RHATANY, the name of a drug obtained from the root of certain South American species of *Krameria*, an anomalous genus sometimes placed in the family *Polygalaceæ*, sometimes in the family *Leguminosæ*, and sometimes made to constitute a family of its own, the *Krameriaceæ*. The medicinal principle is a tannin; useful as an astringent.

RHEA. See CYBELE, Vol. VI, p. 744.

RHEA, HORTENSE, a Belgian actress; born in Brussels in 1848. She early in life made the acquaintance of Charles Fechter, who in turn placed her in the care of Samson, the famous instructor of Rachel. Through the influence of Samson she was permitted to study under Beauvilliet in the Paris Conservatoire. For ten years she attained success in France, and in 1881 visited the United States, playing first in Boston. Her principal success was in tragedy, in *Adrienne Lecouvreur*.

RHEA SILVIA. See ROMULUS, Vol. XX, p. 840.

RHEINBERGER, JOSEPH, a Bavarian composer; born in Vaduz, principality of Liechen-

stein, March 17, 1839. He was church-organist in his native place when seven years old, and studied at the Munich Conservatory from his 12th till his 19th year; later was teacher there on the piano; was organist in the hofkirche; afterward professor of counterpoint and of higher school of organ-playing in the Royal School of Music, and conductor of the court band at Munich. He published the symphonies *Wallenstein* and *Florentinische Sinfonie*; the operas *Die Seiden Raben*, and Thürmer's *Töchterlein*, besides a large number of overtures, concertos, selections of chamber-music and church-music.

RHEINISH WINES OR RHINE WINES. See WINE, Vol. XXIV, pp. 602-610.

RHETT, ROBERT BARNWELL, an American public man; born in Beaufort, South Carolina, in 1800. He studied law, and in 1832 was made attorney-general of South Carolina. From 1838 till 1849 he was a member of Congress, and in 1850-51 was United States Senator. He expressed himself openly in favor of dissolving the Union, both in Congress and in the Charleston *Mercury*, which he owned and conducted. In 1860 he took a prominent part in the state convention which passed the ordinance of secession. He was chairman of the committee which reported the constitution of the Confederate states to the convention in Montgomery, Alabama. Subsequently he was a member of the Confederate Congress. At the close of the war he retired from public life, and spent the remainder of his days in his native state. He died in St. James's Parish, Louisiana, in 1876.

RHEUM. See RHUBARB, Vol. XX, p. 529.

RHIND, J. MASSEY, a Scotch sculptor; born near Edinburgh; descended from a line of famous Scotch sculptors and artists; studied under Delau in Paris. He early developed great talent, receiving in one year at the South Kensington three gold medals. He removed to America in 1889, and immediately attracted attention. His designs show great originality, accuracy and taste. Among his works in the United States the principal are the bronze doors of Trinity Church, New York; the façade at the entrance of the American Surety Building, New York; the Rufus King memorial fountain, Albany; and the entrance ornamentation for Alexander Commencement Hall of Princeton University. In 1896 he completed a colossal statue of John Calhoun for the state of North Carolina.

RHINEBECK, a village of Dutchess County, southeastern New York, 16 miles above Poughkeepsie, on the Philadelphia, Reading and New England railroad, and near the Hudson River. It is a stock-raising and farming center, has a brisk trade, and manufactures wagons and carriages. It has good schools, a bank, several churches, and newspapers. Population 1890, 1,649.

RHINELANDER, a village and the capital of Oneida County, central northern Wisconsin, 65 miles N.E. of Wausau, on the Wisconsin River, and the Chicago and Northwestern and the Minneapolis, St. Paul and Sault Ste. Marie railroads. It is surrounded by great pine forests, and manufactures lumber, wagons, staves, and has turning-works,

foundry and machine-shop. Population 1890, 2,658; 1895, 4,330.

RHINOCEROTIDÆ. See **RHINOCEROS**, Vol. XX, p. 521.

RHIZOCARPEÆ, the old family name of the *Hydropteridæ*, or water-ferns, a small group of aquatic Pteridophytes, comprising the genera *Salvinia*, *Azolla*, *Marsilia* and *Pilularia*.

RHIZOCEPHALA. See **CRUSTACEA**, Vol. VI, pp. 651, 652.

RHIZOME. See **BOTANY**, Vol. IV, p. 98.

RHIZOPODA. See **FORAMINIFERA**, Vol. IX, p. 371.

RHODE ISLAND had a population of 345,506 in 1890, that of 1880 having been 276,531, the gain



STATE SEAL OF RHODE ISLAND.

constituting an increase of 24.94 per cent. The eleventh decennial census showed 10 cities within the state with a population of 8,000 or over, in which resided 272,571 of the people of the state, giving an urban population of 78.89 per cent. In 1880 there were six cities of the size mentioned, in which 175,500 persons lived, the urban population at that time being 63.46 per cent of the whole. At both dates this state had the largest percentage of urban inhabitants. The rank among the states in 1890 was that of 35, that in 1880 was 34. The density of population was 318.44 to the square mile, another item in which Rhode Island led all the states. The number of males was 168,025, the number of females 177,481; the percentage of native-born population was 69.23; the number of negroes 937, a decrease of 120 since 1880; the Chinese numbered 32, the Japanese 1, and the civilized Indians 34. A census taken in 1895, by state authority, gave the population at 384,758, an increase since 1885 of 80,474, or 26.45 per cent.

The latest corrected surveys of Rhode Island give the gross area as 1,250 square miles, of which 165 square miles are water area.

In the acreage devoted to the cultivation of the cereals, Rhode Island stood last among the states and territories, with 12,661 acres, the production being 372,396 bushels. Of the total area, 61.76 per cent was under corn, 0.09 under wheat, 28.81 under oats, 2.87 under barley, 6.15 under rye and 0.32 under buckwheat. The acreage and production of the above-mentioned crops are given in the following table:

GRAIN.	ACRES.	BUSHEL.
Corn -----	7,819	253,810
Wheat -----	11	91
Oats -----	3,648	100,520
Barley -----	363	8,009
Rye -----	779	9,617
Buckwheat -----	41	349

The acreage under corn in 1895, according to the state census of that year, was 13,045, the production 450,000 bushels. The same authority gives the area under oats at 6,741 acres, the production 226,000 bushels. Other agricultural items of the census are as follows: Value of the horses in the state, \$1,082,840; of the cows, \$784,768; of the sheep, \$88,884; of the hogs, \$121,550; of the oxen and other cattle, \$343,267; value of the oats-crop of 1895, \$106,137; of the corn crop, \$355,541; number of cider-mills in the state, 111.

Manufacturing industries increased largely in Rhode Island within the decade ending with 1890, but the number of farms and the area devoted to farming was much decreased. In 1895 a state census was taken, which showed the number of abandoned farms to be, at that time, 419, with an acreage of 36,811, and of an assessed valuation of \$383,250.

The latest complete statistics on manufacturing are those of the eleventh decennial census, which show Rhode Island to have had 3,377 specified manufacturing industries, which utilized \$126,483,401 capital and which furnished employment to 85,976 persons, who received as annual wages the sum of \$37,927,921. The estimated cost of the materials used was \$76,253,023 and the value of the finished products \$142,500,625. The principal line was that of cotton goods, which yielded products of the value of \$27,310,499. Next in importance came worsted goods, \$22,319,684; foundry and machine-shop products, \$10,170,286; woolen goods, \$9,884,945; and jewelry, \$8,011,067. Other lines of importance were: Clothing, all lines, which aggregated \$5,500,000; dyeing and finishing textiles, \$4,743,561; hosiery and knit goods, \$2,516,664; masonry, brick and stone, \$1,495,234; and slaughtering and meat-packing at wholesale, \$4,627,366. The manufacture of shoddy yielded a return of \$1,350,792, and silverware \$2,509,869.

Rhode Island stood 13 in the order of the value of fisheries in 1889, the total product amounting in value to the sum of \$1,160,454. The aggregate capital invested was \$1,042,072; the number of persons employed, 1,745 fishermen and 469 shoremen; the vessels numbered 110, the boats 1,320. The leading branch of the industry was the menhaden fishery, with a total value of \$508,342. The inland fisheries of the state are under the control of a commission of five members appointed by the governor, and the shell fisheries are regulated by a commission of six members appointed in like manner.

At the beginning of 1895 there were six state banks in Rhode Island, whose resources and liabilities amounted to \$1,983,706. At the same time there were 61 national banks doing business within the state, with capital stocks ranging from \$1,709,200 to \$50,000 each. The clearings of the national banks for 1895 amounted to \$290,908,500. There were also 35 savings banks, the combined deposits amounting to \$67,444,117, belonging to 131,623 depositors, the average amount to the credit of each depositor being \$512.40. The trust companies numbered eight, their cash capital amounting to \$2,808,635.

In 1896 the railroad commissioner of Rhode Isl-

and reported the entire railroad mileage of the state at 623 miles. This included both steam and electric roads, of which the former had about two-thirds of the mileage. The net earnings of all lines during 1895 amounted to \$5,984,568. The state has large interests invested in steamships and sailing-vessels. The tonnage of the port of Providence in 1895 was 8,456 sail, and 18,415 steam. The vessels arriving at the city from foreign ports numbered 102 during the same year. Many lines of steamships connect Providence with other ports of Rhode Island and with New York, Boston, Philadelphia, Norfolk and Baltimore.

The charitable institutions of the state include the Soldiers' Home, in the town of Bristol, to which the state contributed in 1895 \$27,037; Butler Hospital for the Insane, which had 183 patients at the close of 1895, partially supported by the state and partially by the interest from almost \$300,000 invested funds; the State School for the Deaf, with 60 pupils during 1895, costing the state during the same year \$13,428; the State Home and School for Children, in the city of Providence, with 106 children in attendance at the close of 1895, to which the state appropriated \$19,032 during the year; and the Rhode Island School of Design, in Providence, 107 pupils in attendance at the beginning of 1896, and about \$3,000 contributed by the state for the preceding year.

The total expenditure for public education in Rhode Island in 1895 amounted to \$1,707,461, of which



CAPITOL BUILDING, PROVIDENCE.

\$470,945 was drawn from the state treasury and \$1,236,516 was from city, town and district treasuries. The number of children between the ages of 5 and 15 years was 73,175, of whom 57,971 were enrolled in the public schools. Ten thousand eight hundred and twenty-nine attended Catholic schools, 126 attended select schools and only 10,659 children within the school age were reported as not attending some school. The number of graded schools was 989, the number of ungraded 263, the total number of schools 1,252. The average length of the school terms was 9 months and 9 days. The number of male teachers was 172, of female teachers 1,448. The total wages paid to teachers was \$773,503, the average monthly wages of male teachers being \$101.83, of female teachers \$50.06. The number of high-schools was 16, in which 2,715 pupils were enrolled and from which 366 pupils were graduated during the year. Evening schools to the

number of 61 were maintained, in which 7,974 pupils were enrolled, the expenses of all kinds aggregating \$46,971. The free public libraries of the state numbered 45, to which the state awarded \$5,653 during the year. The total number of volumes was 247,233 and the number of patrons 53,303. The following table shows the amount appropriated by the state during 1895 for educational purposes, other than the public schools:

For the State Normal School-----	\$ 18,999
For the State Home and School-----	20,462
For the Rhode Island School of Design-----	1,537
For the Rhode Island Agricultural College-----	10,000
For teachers' institutes, lectures, addresses, etc.-	298
For site and building for the State Normal School,	197,515
For sites, buildings and furniture for schools----	267,085
For apparatus and books of reference-----	15,651
For mileage for pupils of the State Normal School,	2,000

Rhode Island had, in 1890, 402 church organizations, 280 edifices, a total membership of 148,008, which constituted 42.84 per cent of the entire population. The value of the church property of the state was estimated at \$7,583,110. The Adventists had 21 organizations; all Baptist bodies, 113; Roman Catholics, 51; Congregationalists, 34; all Methodist bodies, 52; and Protestant Episcopal, 50. In all, 34 different denominations were represented.

The following table relative to the finances of the state is compiled from the report of the state treasurer for 1895:

	REAL ESTATE.	PERSONALTY.	TOTAL.
Whole state, 1894-	\$295,604,735	\$85,530,316	\$381,135,051
Whole state, 1895-	283,427,125	85,938,543	369,365,668
Dec. dur'g the year	\$ 12,177,610	\$ 408,227	\$ 12,585,837
Total receipts of the state treasurer for 1895--	\$ 1,334,727		
Total payments of the state treasurer for 1895,	1,306,715		
Total indebtedness of the cities of the state, 1895,	21,813,353		
Total indebtedness of the towns of the state,	1895-----		
1895-----	23,540,818		
Total indebtedness of the state 1895 (funded)-	699,000		

The state institutions, with the exception of those already mentioned, are located on a farm of 538 acres, about seven miles from the city of Providence, and comprise the following institutions, having the number of inmates given at the beginning of 1896:

	MALES.	FEMALES.	TOTAL.
State Workhouse and House of Correction-----	177	85	262
State Asylum for the Insane----	313	316	629
State Reform School-----	249	28	277
State Prison-----	151	2	153
Providence County Jail-----	260	26	286
State Almshouse (including 26 boys and 19 girls)-----	158	156	314

For the support of the state institutions at Cranston there was appropriated for 1895 the sum of \$259,079.

At the beginning of 1896 the Rhode Island Military Department was made up of the following: General and staff officers, 29; other commissioned officers, 144; enlisted men—cavalry, 95; artillery, 86; naval battalion, 108; infantry and heavy ar-

tillery, 965; making a total of 1,427. Included in the above were independent organizations numbering 50 officers and 289 enlisted men, a total of 339. Deducting these from the total military force, as above, leaves the National Guard with a strength of 1,088. The state appropriation of 1894 was \$104,000; the Federal, mostly in arms, equipments and accouterments, \$3,450.

Jan. 1, 1896, there were published in Rhode Island 80 newspapers, of which 16 were daily, 1 tri-weekly, 3 semi-weekly, 52 weekly, 1 fortnightly, 1 semimonthly and 6 monthly. Papers were published in all of the 5 counties of the state, and in 26 of the cities, towns and villages, of which 4 were county seats.

The following table gives the population of the principal cities of Rhode Island for 1890 and 1895:

CITY.	1890.	1895.
Providence	132,146	145,472
Pawtucket	27,633	32,577
Woonsocket	20,830	24,408
Lincoln	20,355	22,005
Newport	19,457	21,537
Warwick	17,761	21,168
Johnston	9,778	11,203
East Providence	8,422	10,170
Cranston	8,099	10,575
Cumberland	8,090	8,507
Westerly	6,813	7,636
Burrillville	5,492	5,674
Bristol	5,478	6,730
Coventry	5,068	5,065

The following is a list of the governors of Rhode Island, with their respective terms of office: Arthur Fenner, 1790-1805; Henry Smith, 1805-06; Isaac Wilbur, 1806-07; James Fenner, 1807-11; William Jones, 1811-17; Nehemiah R. Knight, 1817-21; William C. Gibbs, 1821-24; James Fenner, 1824-31; Lemuel H. Arnold, 1831-33; John B. Francis, 1833-38; William Sprague, 1838-39; Samuel W. King, 1839-43; James Fenner, 1843-45; Charles Jackson, 1845-46; Byron Diman, 1846-47; Elisha Harris, 1847-49; Henry B. Anthony, 1849-51; Philip Allen, 1851-52; William B. Lawrence, 1852; Philip Allen, 1852-53; Francis M. Dimond, 1853-54; William Hoppin, 1854-57; Elisha Dyer, 1857-59; Thomas G. Turner, 1859-60; William Sprague, 1860-63; William C. Cozzens, 1863; James Y. Smith, 1863-66; Ambrose E. Burnside, 1866-69; Seth Padelford, 1869-73; Henry Howard, 1873-75; Henry Lippitt, 1875-77; Charles C. Van Zandt, 1877-80; Alfred H. Littlefield, 1880-83; Augustus O. Bourn, 1883-85; George P. Wetmore, 1885-87; John W. Davis, 1887-88; Royal C. Taft, 1888-89; Herbert W. Ladd, 1889; John W. Davis, 1889-91; Herbert W. Ladd, 1891-92; D. Russell Brown, 1892-95; Charles W. Lippitt, 1895-97; Elisha Dyer, 1897-.

See RHODE ISLAND, Vol. XX, pp. 523-525.

RHODES, CECIL JOHN, an English colonial statesman, whose ambitions and ability have won for him the title of the Napoleon of Africa, was born at Bishop's Stortford, Hertfordshire, England, July 5, 1853. His grand-father was a well-to-do dairyman in the Islington suburb of London, to

whom tradition assigns 999 head of cattle and the inability to possess an even 1,000. His father, the Rev. Francis William Rhodes, was for many years vicar of St. Michael's Church in the parish of Bishop's Stortford, where a stained-glass window commemorates the esteem in which the villagers held a benign man, with a remarkable virtue for ten-minute sermons. Cecil, the third son, a weakly youth, received his early education at the local grammar-school, one of King Edward VI's foundation, as did his numerous brothers, of whom one died in the heart of Africa and others did honor to the rolls of the English army. A term or two at Oriel College, Oxford, followed, and then physicians ordered him to the Cape. He landed with moderate means and took to diamond-mining, ultimately consolidating all the mining interests and controlling the diamond supply of Africa. The warm African climate had made a mountain of energy of a weedy English youth. Cape politics soon attracted him. He entered the colonial Parliament as member for West Barkly and later took office in the ministry of Sir Thomas Scanlon. On the fall of Sir Gordon Sprigg's Ministry, July 17, 1890, he became Premier of the colony. In 1891 he visited England, and while there donated \$50,000 to the Irish Home Rule fund. In September, 1893, he took the field against Lobenguela, the warlike king of Matabeleland, with a flying squadron of 600 troopers. In vain did the fearless impis of fierce Matabeles charge the moving square. The Maxim, Gardner and Nordenfeldt machine-guns made as short work of these warlike Naboths as the white gold-seekers did of their vineyards. Charges of slaughtering surrendered prisoners were freely brought against the irregular troops of the Chartered South African Company composing the force. Toward Equatoria they marched, and slaughtered savages as they went. Rhodes had set his mind on a telegraph-line, if not a railroad, to Cairo. Lobenguela tersely called him "The man who eats a country for breakfast," and Lobenguela's kraal at Buluwayo was made the new capital of Rhodesia very soon after Rhodes marched into the land. Loyal to the crown, his deeds and his utterances marked him as a man too imperial for a crown to rule. England began to conciliate this political meteor, who added more to the empire's bounds in a month than armies had won in a century. He was called home and sworn of the Privy Council. But the drawing-rooms of Belgravia were too small a world for the man whose breathing-space was the great Karroo Desert, and thither he returned.



C. J. RHODES.

In the African Hinterland gold-fields were on every hand, and the soil was a second Eden in fertility. Then came the Uitlander agitation in Johannesburg, led by his brother, Colonel Francis W. Rhodes. Of the Cape Premier's knowledge of all

the proceedings, no one questions. None knew better than he that a conflict was bound to come between a majority of Anglo-Saxons deprived of the franchise and a Boer oligarchy. His policy had been Fabian in tactics, but his impetuous lieutenant, Dr. L. S. Jameson (q.v., in these Supplements), flew across the Transvaal border, with results that brought the secret policy of South African administration into notoriety. Rhodes's attitude may be accounted for by his knowledge of Boer intrigues with Germany, but the fact remains of his complicity in the Jameson raid. Resigning from the Cape government and again visiting Downing Street, he hurried back to quell an extensive Matabele revolt and then sat down to assist in administering the government of the land which bears his name. "His aim," as a keen critic said, "is nothing less than the erection of a real British Empire with home rule for all the parts, with an equal citizenship throughout, and with full representation of all the British regions in the central governing bodies. In that case, South Africa would take her place with Australia, Canada and the rest, and all British soil would be deemed equally sacred. This idea entertained by Mr. Rhodes is the only hope for the permanence of the political affiliation of those regions now pertaining to the British crown and known as the 'British Empire.' Other men hold this conception and are working for its realization; but Mr. Rhodes, both in ability and in virtue of his actual place in imperial affairs, stands head and shoulders above them all."—His elder brother, FRANCIS WILLIAM RHODES, was a dashing cavalry officer, a trusted aide of the present commander-in-chief, Lord Wolseley. He saw sharp service in Egypt, was aide-de-camp to a Lord-Lieutenant in Ireland, and then, magnetically attracted to his brother's star rising in Africa, though colonel commanding the First (Royal) Dragoons, he went to Johannesburg to superintend mining interests there. He took a leading part in the insurrectionary movement, and enrolled the Uitlanders against the Boers. On the fiasco of Jameson's raid, he, with others, was arrested and tried before an Orange Free State judge and sentenced to death. The punishment was at once commuted to a fine of \$125,000, brief imprisonment and banishment in default of abjuring civil rights. Colonel Rhodes then left the Transvaal.

RHODES, INNER AND OUTER. See APPENZELL, Vol. II, p. 210.

RHODESIA, a popular and complimentary name given to that part of South Africa which lies between the South African or Transvaal republic on the south, the Congo Free State and German East Africa on the north, and German Southwest Africa and Angola on the west. To the indomitable purpose of CECIL JOHN RHODES (q.v., in these Supplements) is due the inclusion of this vast and richly auriferous territory in the British Empire, and popular gratitude bestowed his name on an area greater than that of his native isle.

Rhodesia is divided by the River Zambesi into a southern portion, known as Matabeleland and Mashonaland, and a northern portion called Nyassa-

land. Its story is entirely one of conquest. The *auri sacra fames* brought prospectors into conflict with the warlike Matabeles, whereupon the military police of the Chartered South African Company crushed the power of Lobenguela and his athletic warriors. Gold, iron and coal are found in considerable quantities; the ancient ruins and gold-workings of Mashonaland being considered by some the site of the Ophir of Solomon's days. The fertility of the land as pasturage is great. A railroad toward the northern boundary is under construction, and telegraph lines already reach to Buluwayo, the capital, to Fort Charter and Fort Salisbury. The possession of Rhodesia gives England an outlet to the equatorial provinces of the Nile, and affords feasibility to Cecil Rhodes's long-cherished plan of a telegraph line from the Cape to Cairo and thence to his motherland. See also AFRICA, in these Supplements.

RHODIUM. See CHEMISTRY, Vol. V, pp. 536-538.

RHODIUM, OIL OF, a volatile oil obtained from the root of species of *Rhodoriza*, a genus of the family *Convolvulaceæ*, growing in the Canary Islands. It is used in perfumery.

RHODOPE. See THRACE, Vol. XXIII, p. 318.

RHOPALOCERA. See INSECTS, Vol. XIII, p. 151.

RHOTACISM. See LATIN LANGUAGE, Vol. XIV, pp. 327, 328.

RHUMB-LINE. See NAVIGATION, Vol. XVII, p. 254.

RHUS, a genus of plants of the family *Anacardiaceæ*, commonly known as sumachs. They are shrubs or trees, with ample terminal or axillary panicles of small flowers, mostly compound leaves and dry or berry-like fruit. Besides the various well-known sumachs, the genus contains the smoke-tree (*R. cotinus*), poison ivy (*R. toxicodendron*), and poison sumach (*R. venenata*). See JAPANNING, Vol. XIII, p. 592.

RHYNCHOCEPHALIA. See REPTILES, Vol. XX, pp. 444, 448.

RHYNCHOPHORA. See COLEOPTERA, Vol. VI, p. 133.

RHYNCHOTUS, a bird. See TINAMOU, Vol. XXIII, pp. 402, 403.

RHYOLITE OR LIPARITE. See GEOLOGY, Vol. X, p. 234.

RHYS, JOHN, a British philologist; born near Ponterwyd, in Cardiganshire, June 21, 1840; served a pupil-teacher's apprenticeship, and after a course at Bangor Normal College kept a school in Anglesey down to the end of 1865, when he entered Jesus College, Oxford. He was elected to a fellowship at Merton in 1869, and next continued his studies at the Sorbonne, Heidelberg, Leipsic and Göttingen, returning in 1871 to become inspector of schools for Flint and Denbigh. In 1877 he was appointed professor of Celtic in the University of Oxford, and in 1881 was elected to a fellowship at Jesus College. His *Lectures on Welsh Philology* (1877), and *Celtic Britain* (1882), confirmed the reputation for erudition which he had already gained by his contributions to Kuhn's *Beiträge zur Vergl. Sprachforschung*,

the *Revue Celtique*, and the *Archæologia Cambrensis*. He gave the Hibbert lectures on *Celtic Heathendom* in 1886; at the close of 1889 the Rhind lectures on *The Early Ethnology of the British Isles*, at Edinburgh; in 1891 he published *Studies in the Arthurian Legends*; and in 1892 *Inscriptions and Languages of the Northern Picts*.

RIAZAN. See RYAZAN, a town in Russia. See Vol. XXI, p. 116.

RIBALTA, FRANCISCO, a Spanish artist; born in Castillon de la Plana, in 1551. He studied at Valencia, and later at Rome. His first work on his return home was *Cura*, for Corpus Christi College. His coloring was rather harsh. He was a good draftsman, and knew anatomy thoroughly. His pictures are in churches in all the larger cities of Spain. He died in Madrid, Jan. 12, 1628.

RIBBECK, JOHANN KARL OTTO, a German philologist; born in Erfurt, in 1827. In 1859 he was made professor of ancient languages in the University of Berne; in 1862, at Kiel; in 1872, at Heidelberg, and in 1877, at Leipsic. His chief publications are *Scenica Romanorum Poesis Fragmenta*; *Die Römische Tragödie im Zeitalter der Republik* (1875); *Biography of Friedrich Ritschl* (1881); and *Geschichte der Römischen Dichtkunst*. He also edited a critical edition of *Virgil*.

RIBEIRO, BERNARDIM. See PORTUGAL, Vol. XIX, p. 556.

RIBOT, ALEXANDER FÉLIX JOSEPH, a French lawyer and statesman; born at St. Omer, Feb. 7, 1842. He studied law in Paris, and was first secretary of the bar society in 1870; in 1875 appointed Director of Criminal Affairs and Pardons; in 1878 was elected to the Chamber from the second circonscription of Bologne-sur-Mer, and became one of the leaders of the moderate republican element; was re-elected in 1881; in 1886 failed to obtain reelection, and retired from public life until 1887, when he was returned from Pas-de-Calais; in 1889 from the circonscription of St. Omer; held the portfolio of Foreign Affairs in M. Freycinet's cabinet in 1890 and retained it in M. Louvet's administration. Upon the fall of the Louvet government on account of the Panama scandals, M. Ribot became president of the cabinet (January, 1893), and Minister of the Interior. His government was overthrown in March, 1893. In January, 1895, upon the election of Faure to the Presidency, M. Ribot was again made Premier, and remained in office until the October following, when he was superseded by M. Bourgeois. M. Ribot was always a moderate republican. He was one of the strongest opponents of General Boulanger's schemes.

RIBOT, AUGUSTIN THÉODULE, a French painter; born in Breteuil, Eure, Aug. 28, 1823; he was a pupil of Glaize, at Paris. He obtained a third-class medal at the Paris Exposition of 1878, and was decorated with the Legion of Honor in the same year. Among his paintings are *St. Sebastien*; *Jésus et les Docteurs*; *Samaritain*; and *Mère Morieu*. The first three named are in the Luxembourg. He died Sept. 12, 1891.

RIBOT, THÉODULE ARMAND. See EVOLUTION, Vol. VIII, p. 767.

RIBS. See ANATOMY, Vol. I, p. 822.

RICASOLI, BETTINO, BARON, an Italian statesman; born in Florence, March 9, 1809. In March, 1847, with some companions, he addressed two memorials to the Tuscan government, demanding a constitution and a free press. During the revolution following, Ricasoli established *La Patria*. He was then chosen mayor of Florence, and in the next year entered the Tuscan Parliament. After the battle of Novara he favored the recall of the Grand Duke, in the hope of effectual resistance to the Austrian domination. But he was disappointed, and soon abandoning political activity, he devoted his energy to the improvement of a newly purchased estate in the Maremma. He was induced, some years later, to place himself at the head of the National party, and was the chief founder of the *Biblioteca Civile dell' Italiano*. In 1859 the Grand Duke fled, and Ricasoli, who was Minister of the Interior in the provisional government, contributed essentially to effect the union with Sardinia, which was formally declared March 22, 1860. He was then appointed governor-general of Tuscany, and was also elected to the enlarged Sardinian Parliament and to the first Italian Parliament, which met in February, 1861. After the death of Cavour, in June, he formed a new ministry, taking for himself the department of Foreign Affairs. Though he was faithful to Cavour's policy, he could not command his followers, and in March, 1862, he retired. He was still the representative of Florence in the Parliament, and in 1866 he was again Premier and Minister of the Interior, though only for ten months. His *Letters and Papers* were published at Florence (1886-89). He died at Brollo, near Siena, Oct. 23, 1880.

RICE, ALLEN THORNDYKE, an American editor; born June 18, 1853, in Boston, Massachusetts, and graduated at the University of Oxford, England, in 1875. The following year he became owner and editor of the *North American Review*, and in 1884 purchased *Le Matin*, a leading journal of Paris, France. He originated in 1879 and directed an expedition into Mexico and Central America, conducted by the United States and France for the purpose of investigating the remains of ancient civilization existing in those countries. He was first to bring the Australian ballot system to the attention of the American people, and it was largely through his efforts that the Republican party incorporated a demand for ballot reform in their platform in 1887. He was defeated for Congress in 1886, and in 1889 was appointed United States minister to St. Petersburg, but died (May 16, 1889) before entering upon the discharge of his official duties.

RICE, INDIAN, WATER-RICE OR WILD RICE, common names of *Zizania aquatica*, a common water-grass of the central and western United States. It is tall and reed-like, with large leaves, a terminal ample panicle, and slender grains, collected for food by the Indians.

RICE-BIRD, a name used in the rice-growing regions of North America for the bobolink (*Dolichonyx*). The bird passes the winter in the Southern

states and adjacent islands. In the spring it migrates far north, and is generally known as the bobolink. In Pennsylvania it is called reed-bird. In the autumn it returns to the South, and feeding upon the rice, becomes fat, and is esteemed as a table delicacy.

RICHARDS, THOMAS ADDISON, an English-American landscape-painter; born in London, Dec. 3, 1820; arrived in the United States in 1831, and for ten years was a resident of Georgia; afterward studied art in New York City. He was chosen a member of the National Academy in 1851, secretary of that organization in 1852, and in 1858 became director of the Cooper School of Design. In 1878 he was made an A.M. by the New York University, and became professor of art there in 1867. Among his paintings are *Alastor* (1854); *Live-Oaks of the South* (1859); and *Warwick Castle* (1869). Mr. Richards did a great deal of work as a book-illustrator. Among the publications for which he supplied illustrations are *The American Artist* (1838); *Summer Stories of the South* (1853); *Pictures and Painters* (1870), and several of Appleton's *Guide Books*. He also contributed many illustrated papers to *Harper's Magazine*.

RICHARDS, WILLIAM TROST, an American artist; born in Philadelphia, Pennsylvania, Nov. 14, 1833. He studied with Paul Weber, and in 1855 went abroad; visited Europe in 1867, and again in 1878; and from 1878 to 1880 had a studio in London. For many years he resided in Philadelphia; was a member of the Pennsylvania Academy, the National Academy, and of the American Water Color Society. Among his paintings in oil are *Midsummer* (1862); *Woods in June* (1864); *Land's End* (1880); *Old Ocean's Gray and Melancholy Waste* (1885); and *The Wissahickon*, exhibited at the Centennial (1876). He is equally well known on account of his water-colors, among which are *Paradise, Newport* (1875); *Sandhills, Coast of New Jersey* (1876); and *A Summer Afternoon* (1886). His *On the Coast of New Jersey* is in the Corcoran Gallery, in Washington. In his youth Mr. Richards was a pronounced pre-Raphaelite, and all of his paintings show a careful regard for detail. Later, he painted largely marine pictures.

RICHARDSON, SIR BENJAMIN WARD, an English surgeon and physician; born at Somerby, County of Leicester, Oct. 31, 1828; graduated in medicine at the University of St. Andrews in 1854; became a member of the Royal College of Physicians by examination in 1856, and a fellow of the college in 1861; fellow of the Royal Society in 1867; honorary member of the Philosophical Society of America in 1863, and of the Physiological and Statistical Academy of Milan in 1870. He was also an honorary member of the Royal Society of Hygiene of Italy, and of the Society of Hygiene of France. He was president of the Medical Society of London, and thirty-two times president of the St. Andrews Medical Graduates' Association, and a member of numerous other scientific bodies. In 1856 he received a prize of £300 for an essay on the coagulation of the blood. His experimental re-

searches resulted in the detection of a special toxic in contagious diseases, which he called *septicine*; in the application of ether spray for the abolition of pain in surgical operations; in the use of methylene bichloride as an anæsthetic; in the employment of amyl nitrite in tetanus, asthma and other spasmodic affections; and in the use of the *lethal chamber*, which he invented, for subjecting domestic animals to painless death. For some years he published the *Asclepiad*, devoted to the science, art and literature of medicine, preventive and curative. In recognition of his various contributions to science and medicine, in 1868 six hundred of his medical brethren presented him with a microscope by Ross and one thousand guineas; in 1877 the University of St. Andrews conferred on him the degree of LL.D.; knighted in 1893; he died in London, Nov. 21, 1896.

RICHARDSON, HENRY HOBSON, an American architect; born in Priestley's Point, Louisiana, Sept. 29, 1838. He graduated at Harvard in 1859, and went to Paris to study architecture, remaining there until 1865. The loss of his property during the Civil War made it necessary for him to work in an architect's office while carrying on his studies. Returning to the United States, he became a partner in the firm, Gambrill and Richardson, of New York. His first work was done in Springfield, Massachusetts, where he built the railroad offices, the Agawam bank and the Church of the Unity. His best work, however, began with the erection of the Brattle Street church, Boston, in 1871. After this was completed he spent much of his time for six years on Trinity church, in the same city, which was built in the style of the Provençal cathedrals. For many years he was employed on the New York state capitol at Albany with Frederick Law Olmsted and Leopold Eidlitz. Among the many other buildings which he planned are Sever and Austin halls at Harvard, the public library at Woburn and the Board of Trade building at Cincinnati, Ohio, which was unfinished at the time of his death. Mr. Richardson may be said to have created a particular style of architecture, which is strong, simple and refined, and has had a powerful influence for good on the taste of the country. His method of producing effect was by an artistic disposition of mass rather than by elaboration of decoration. He removed to Brookline in 1875, and thereafter his workshops were crowded with students. He died April 28, 1886. Mrs. Schuyler Van Rensselaer has written his *Life* (1888). See ARCHITECTURE, in these Supplements.

RICHARDSON, WILLIAM ADAMS, an American jurist and statesman; born in Tyngsboro, Massachusetts, Nov. 2, 1821; descended from



H. H. RICHARDSON.

Ezekiel Richardson (died, 1642), a pioneer and selectman of Woburn, Massachusetts; graduated at Harvard in 1846, and in the law department there in 1846; called to the bar at Boston, Massachusetts, the same year; was judge-advocate and governor's aide; appointed in 1855 to revise the general statutes of the state; subsequently chosen to edit the annual supplements of the general statutes; in 1856 was judge of probate for Middlesex County, and of probate and insolvency from 1858 to 1872. In 1869 he was appointed by President Grant assistant secretary of the treasury; was detailed as financial agent abroad, and conducted the delivery in London of over \$130,000,000 of bonds of the United States 5-percent loan. In 1873 he was appointed Secretary of the Treasury, and accomplished the transfer from London to Washington of the \$15,550,000 Geneva award. In 1874 he accepted the appointment of judge of the court of claims; and in 1885 was promoted by President Arthur to be chief justice of the same court. He was a trustee of Harvard University; lecturer in the law department of Georgetown University, District of Columbia, and received the degree of LL.D. from Harvard, Columbian and other universities. He edited a supplement to the Revised Statutes of the United States in 1851, and in 1891 also published *The Banking Laws of Massachusetts* (1855); with George F. Sanger, *Supplement to the General Statutes of Massachusetts* (1863-64); *National Banking Laws* (1872); *Practical Information Concerning the Public Debt of the United States* (1872); *History, Jurisdiction and Practice of the Court of Claims* (1882-85). He died in Washington, District of Columbia, Oct. 19, 1896.

RICHARDT, CHRISTIAN ERNST (1831-93). See DENMARK, Vol. VII, p. 93.

RICHELIEU, a river and canal. See ST. LAWRENCE, Vol. XXI, p. 181.

RICHEPIN, JEAN, a French poet and novelist; born in Médéah, Algeria, Feb. 4, 1849, where his father was army surgeon. He was educated at the lycées Napoleon and Charlemagne, in Paris; began the study of medicine, and in 1868 entered the Normal School in the department of letters. During the Franco-Prussian War he was editor of *L'Est* in Franche Comté, returned to Paris and published the novel, *Jules Vallès* (1872), and the drama *L'Étoile*, written in collaboration with André Gill; in 1876 was imprisoned and fined for publishing his *Chanson des Gueux*; after being liberated was a sailor for a time, and then returned to Paris, became editor of the *Gil Blas*, and devoted himself entirely to literature. M. Richepin, in prose and verse, is one of the most prominent representatives of the realistic or naturalistic schools of Paris, and, faithful to its principles, had no regard for conventionalities, literary, moral or social. His works have been often attacked and frequently suppressed. His poems, however, which are mostly lyrics, are bold and graceful, and all his work bears the stamp of individuality. Among his poetry might be mentioned *Les Caresses* (1877); *Les Blasphèmes*

(1884); and *La Mer* (1886), a collection of poems. He also published the novels *Madame André* (1874); *Les Morts Bizarres* (1878), a collection of short stories written in prison; *Sophie Monnier* (1884); *Truandailles*; and many others. For the stage he wrote *La Glu* (1883); *Nana Sahib* for Sarah Bernhardt, in which Richepin took the principal male rôle when Mme. Bernhardt's leading man was taken sick; and *Monsieur Scapin*, in verse, which was produced at the Comédie Française in 1886. He also wrote the libretto for Massenet's *Le Mage*.

RICHFIELD, a city and the capital of Sevier County, central Utah, 85 miles S. of Salt Lake City, on the Rio Grande Western railroad. It is in an agricultural region. Population 1890, 1,531; 1895, 1,817.

RICHFIELD SPRINGS, a village of Otsego County, eastern New York, at the head of the Canadarago Lake, 11 miles N. of Cooperstown and 63 miles E. of Albany, on the Delaware, Lackawanna and Western railroad. It has medicinal springs, which are well known for their curative properties in cases of rheumatism and skin diseases. It is also a summer resort. Population 1890, 1,623.

RICHFORD, a village of Franklin County, extreme northern Vermont, 45 miles N.E. of Burlington, on the Canadian Pacific and the Central Vermont railroads. It is a well-known lumber-manufacturing center, and has a number of mills run by steam and water power. Population 1890, 1,162.

RICH HILL, a city of Bates County, western Missouri, 55 miles S. of Kansas City and 37 miles S.E. of Clinton, on the Missouri Pacific and the Kansas City, Fort Scott and Memphis railroads. Coal-mining is the leading industry, about 200,000 bushels daily being mined. There are also lead, iron and zinc deposits. It has extensive smelting-works, a large foundry and machine-shop, flour-mills, large vitrified brick and tile factory and a soda-water factory. Population 1890, 4,008.

RICHIBUCTO, a town, formerly known as LIVERPOOL, capital of Kent County, in New Brunswick, on the Northern and St. Louis and the Richibucto railroads. It is a seaport town and port of entry to New Brunswick, at the mouth of Kent River, 46 miles N.E. of St. John. It has a large trade in lumber and fish. Ship-building is also extensively carried on. Population 1891, 3,986.

RICHLAND CENTER, a city and the capital of Richland County, south central Wisconsin, 55 miles E.S.E. of Madison and 55 miles N.W. of La Crosse, on the Chicago, Milwaukee and St. Paul railroad. It is in a farming, dairying, stock-raising and lumbering district, and has water-power utilized by flour and saw mills. Population 1890, 1,819.

RICHMOND, a city 2 miles E. of Melbourne, in Australia. It has a distinct municipality and ranks as a city, although only a suburb of Melbourne. Population 1889, 37,550.

RICHMOND, a town and the capital of Madison County, central eastern Kentucky, 32 miles S. of Paris and 25 miles S.E. of Lexington, on the Louisville and Nashville and the Richmond, Nicholasville, Irvine and Beattyville railroads. Iron, coal and lumber are abundant in the vicinity; it is noted for breeding horses, mules and cattle, and is the seat of the Central University, organized in 1874, which is of Presbyterian denomination, and had in 1896, 37 instructors, 754 pupils, and a library containing 8,000 volumes. Population 1890, 4,753.

RICHMOND, a town of southern Maine, 16 miles S. of Augusta, on the Kennebec River and on the Maine Central railroad. It has manufacturing of boots and shoes, of lumber, and has a large ice trade. Population 1890, 3,000.

RICHMOND, a city and the capital of Wayne County, eastern Indiana, 66 miles E. of Indianapolis, on the Cincinnati, Hamilton and Dayton, the Grand Rapids and Indiana and the Pittsburgh, Cincinnati, Chicago and St. Louis railroads. Richmond is considered one of the most beautiful and most prosperous cities in the state, and embraces as its principal manufactures that of threshing-machines, farming-implements, engines and boilers and machinery. The city has an

on a commanding site. The chief industries are the railway works and machine-shops. Population 1890, 2,056.

RICHMOND, a village and the capital of Fort Bend County, southeastern Texas, 22 miles S.W. of Houston, on the Gulf, Colorado and Santa Fé, the Galveston, La Porte and Houston and the Southern Pacific railroads; also on the Brazos River. Steamboats can ascend the river as far as Houston. It does considerable shipping trade in cotton, corn, hides and sugar. Population 1890, 993.

RICHMOND, the capital of Virginia. It is the seat of Richmond College (Baptist), established in 1832; and in 1896 had 12 instructors, 205 pupils, and a library containing 12,200 volumes. Among the most recent buildings and monuments that have been erected are a new public library, a statue of Gen. W. C. Wickam in Monroe Park, and a bronze statue of General Robert E. Lee at Lee Circle, in the western part of the city. The city now contains 5 public libraries, with an aggregate of 50,000 volumes, and 6 daily papers, 21 weekly and 14 monthly periodicals. The following will show the amount of business transacted by some of the leading manufacturing industries of the city:

INDUSTRY.	NUMBER OF ESTABLISHMENTS.	AGGREGATE INVESTMENT.	AVERAGE NUMBER EMPLOYEES.	AVERAGE TOTAL WAGES.	VALUE OF PRODUCTS.
Tobacco, chewing, smoking and snuff-----	23	\$2,450,375	3,436	\$833,952	\$4,598,269
Tobacco, cigars and cigarettes-----	44	1,639,073	2,059	657,559	3,372,162
Tobacco, stemming and rehandling-----	12	606,889	827	32,062	1,725,771
Agricultural implements-----	4	202,500	159	89,712	222,670
Boots and shoes-----	3	71,669	215	84,866	165,307
Flouring and grist-mill products-----	4	854,946	180	94,025	1,874,624

abundant supply of natural gas for fuel, excellent water and drainage system, and several lines of electric street-railway. There is a fine public school, five libraries, containing over twenty-seven thousand volumes, and it is the seat of Earlham College (q.v., in these Supplements). Population 1890, 16,608.

RICHMOND, a city and the capital of Ray County, northwestern Missouri, 8 miles N. of Lexington and 35 miles N.E. of Kansas City, on the Atchison, Topeka and Santa Fé railroad. It is in an agricultural and coal-mining district, has a new water-works plant, and is the seat of Woodson Institute. Population 1890, 2,895.

RICHMOND, a village of Union County, central western Ohio, 35 miles N.W. of Columbus, on the New York, Lake Erie and Western railroad; it is in an agricultural district, and has two large flour-mills, two steam tile-mills, several large grain-elevators, a planing-mill, two private banks and two weekly papers. Population 1890, 1,415.

RICHMOND, the capital of the counties of Wolfe and Richmond, southeastern Quebec, Canada, on the St. Francis River, a tributary of the St. Lawrence, 76 miles E. of Montreal. St. Francis College, an institution affiliated to McGill University, stands at the upper end of the town,

Population 1880, 63,600; 1890, 81,388. See also RICHMOND, Vol. XX, p. 545.

RICHMOND, GEORGE, an English portrait-painter; born in 1809; entered the schools of the Royal Academy in 1824; began painting in water-colors, and later in oils; was elected associate of the academy in 1859 and academician in 1867. He painted almost three thousand portraits, many of them of prominent men and women, among which are *The Earl of Elgin* (1860); *The Duke of Buccleuch* (1865); and *Sir Moses Montifiore* (1875). Among his other paintings are *Agony in the Garden* (1858); and *Sunset from Hyde Park* (1861). As an artist he was conscientious and painstaking, frequently to such an extent that his work appeared over-labored. What his paintings lack in spontaneity is made up for by their carefulness of execution. He died March 21, 1896.

RICHMOND, WILLIAM BLAKE, an English artist, son of George Richmond; born Nov. 29, 1843. He studied at the Royal Academy, and in 1859-60 traveled in Italy; in 1865 went to Rome to study. In 1870 he settled in England, and afterward followed art as a profession; was Slade professor at Oxford from 1878 to 1883, the position which Ruskin filled before and after him, and was elected associate of the Royal Academy. Among his paintings are *Procession of Bacchus*

(1868); *Prometheus Bound* (1873); and *Electra at the Tomb of Agamemnon*; besides portraits of Holman Hunt, Darwin, Princess Louise, and others.

RICHTER, GUSTAV CARL LUDWIG, a German portrait-painter; born in Berlin, Aug. 31, 1823. He studied in the Berlin academy and in Paris; was made professor in the Berlin academy and member of the academies of Vienna and Munich; obtained the grand medal in Berlin (1864); other medals in Paris, Vienna and Philadelphia. He is best known for his portraits, among which are those of *Queen Louise* (1879), in the Cologne museum; and the *Hon. George Bancroft*, exhibited at the Philadelphia Exposition of 1876. His Oriental scenes, *Odalisque*; *The Raising of Jairus' Daughter*, in the National Gallery at Berlin, and others, show good drawing and very rich color effects. He died April 3, 1884.

RICHTER, HANS, a German musical conductor; born in Raab, Hungary, April 4, 1843. In 1859 he entered the Conservatorium in Vienna and studied the horn under Kleinecke and theory under Lechter; played the horn in the orchestra of the Kärnthnerthor; in 1868 was made conductor of the Hof-and-National Theater, Munich; in 1871 chief conductor of the national theater at Pesth; at the Court Opera Theater in Vienna (1875); in 1876 conducted the Bayreuth Festival; in 1879, 1880 and 1881 conducted concerts in London, and attracted great attention by using no scores. Richter was one of the foremost orchestra conductors, a prominence which perhaps he owed to his practical knowledge of the technique of the instruments in an orchestra.

RICHTOFEN, BARON FERDINAND, a German geologist; born in Carlsruhe, Silesia, May 5, 1833. He studied at Breslau and Berlin, and in 1856-60 made investigations in the geology of the Tyrol, Vorarlberg and Transylvania. In 1860 he accompanied the Prussian geological expedition of Count Eulenberg to Asia, left them in Siam and made explorations in Java, the Philippines, California, Nevada, Japan and China, returning to Europe in 1872. He was elected president of the Geographical Society of Berlin upon his return, and in 1875 professor of geography at Bonn; in 1883 professor of geology at Leipsic. Among other works he published *The Production of Metals in California* (1865); *Principles of the Natural System of Volcanic Rocks* (1867); *China: The Results of Voyages and Studies in that Country* (1877-85); *Problems and Methods of the Geography of To-day* (1883); and in 1885 began the publication of a geographical and geological *Atlas of China*.

RICINUS. See CASTOR OIL, Vol. V, p. 200.

RICO, a town and the capital of Dolores County, southwestern Colorado, 22 miles N.E. of Silverton, on the Rio Grande Southern railroad. There are gold, silver, copper and iron mines in the vicinity, which have been much developed since 1892, owing to the completion of the railway between Ridgway and Durango, Ridgway being 66 miles S.W. and Durango 95

miles N.W. of Rico. It has a national bank and a state bank, both with a capital of \$50,000. Population 1890, 1,134.

RIDDLE, MATTHEW BROWN, an American theologian; born in Pittsburg, Pennsylvania, Oct. 17, 1836. He was educated at Jefferson College, New Brunswick Theological Seminary, and Heidelberg; was instructor at Jefferson College from 1857 to 1858; in 1861 became chaplain of a New Jersey regiment; from 1862 till 1869 was successively pastor of Reformed Dutch churches at Hoboken and Newark, New Jersey; in 1871 became professor of New Testament exegesis in the Hartford Theological Seminary; in 1887 accepted the same chair in the Western Theological Seminary, at Allegheny, Pennsylvania. Dr. Riddle was a member of the American committee on the revision of the New Testament; translated and edited the epistles to the Romans, Galatians, Ephesians and Colossians in Dr. Schaff's edition of *Lange's Commentary* (1869); and revised Dr. E. Robinson's *Harmony of the Gospels*, Greek (1885), and English (1886).

RIDEAU, a river and canal. See OTTAWA, Vol. XVIII, p. 68.

RIDGEFIELD, a town of Fairfield County, southwestern Connecticut, 28 miles N.W. of Bridgeport, on the New York, New Haven and Hartford railroad; in an agricultural district, and makes a specialty of sending milk to New York; has quarrying and grinding of feldspar and quartz; is a popular summer resort, and has a public library and several country residences of New Yorkers. Population 1890, 2,235.

RIDGETOWN, a town of Kent County, Ontario, Canada, 50 miles S.W. of London, on the Michigan Central railroad. It has flour, woolen and lumber mills, and two weekly papers. Population 1890, 2,254.

RIDGEVILLE, a village of Randolph County, eastern Indiana, 21 miles N.E. of Muncie, on the Grand Rapids and Indiana and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. It is the seat of Ridgeville College (Congregational), a co-educational institution organized in 1892, and having in 1896, 7 instructors, 100 students and a library containing 1,000 volumes. Population 1890, 716.

RIDGWAY, ROBERT, an American ornithologist; born in Mount Carmel, Illinois, July 2, 1850. He was educated in the common schools, and in 1864 was appointed naturalist on the United States geological exploration of the fortieth parallel, under Clarence King; in 1879 was appointed curator of the collection of birds in the United States National Museum. Mr. Ridgway was a member of a number of ornithological and scientific societies in this country and abroad, and published over two hundred books and papers, among which are *Report on Ornithology of the Fortieth Parallel* (1877); *A Nomenclature of Colors for Naturalists* (1886); *Manual of North American Birds* (1887); and was the joint author, with Spencer F. Baird and Thomas M. Brewer, of *A History of North American Birds* (3 vols., 1874) and *The*

Water Birds of North America (2 vols., 1884), of which works he wrote the technical parts.

RIDPATH, JOHN CLARK, an American educator and author; born in Putnam County, Indiana, April 26, 1840. He obtained his early education under great difficulties, entered Asbury (now De Pauw) University at 19, and graduated with the highest honors. He became instructor in the Thorntown (Indiana) Academy immediately after graduation; in 1864 its principal; in 1867 professor in Baker University, Kansas; in 1869 professor of English literature in Asbury University; in 1879 vice-president of the institution. He was the author of *Academic History of the United States* (1874-75); *Popular History of the United States* (1876); *Monograph on Alexander Hamilton* (1880); *Life and Work of Garfield* (1881-82); *History of Texas* (1884); *A Cyclopædia of Universal History* (3 vols., 1880-84); and *Great Races of Mankind* (1894). Professor Ridpath was very influential in securing an endowment of from \$1,500,000 to \$2,000,000 from the late Mr. De Pauw and in re-chartering the institution under the name of De Pauw University. After performing this service for the university, he resigned his position as professor and vice-president, and gave his attention entirely to literature.

RIEDELSE, FRIEDRICH ADOLPH, BARON VON, a German soldier; born in Lauterbach, Rhine-Hesse, June 3, 1738. He served in the Seven Years' War, on the staff of Prince Ferdinand of Brunswick, attaining the rank of colonel. At the outbreak of the American Revolution he was placed in command of the British mercenaries from Brunswick, with the rank of major-general. He took part in Burgoyne's disastrous campaign, was taken prisoner at Saratoga, exchanged in 1779, and received a command on Long Island. Upon his return to Germany he was made lieutenant-general. His *Memoirs, Letters and Military Journals* have been translated by William L. Stone (1868). He died Jan. 6, 1800.

RIEHL, WILHELM HEINRICH, a German novelist and historical writer; born in Bieberich, May 6, 1823. He was educated at Giessen and elsewhere, and for ten years was editor of journals in Frankfort, Heidelberg and Wiesbaden; in 1853 became professor at Munich, and in 1862 was elected to the Munich Academy of Sciences. He published *Natural History of the People* (1851-69); *History of Civilization* (1865); *New Book of Novels* (1867); *Studies of the Civilization of Three Centuries* (1859); *Types and Characters of Musicians* (1878); *German Labor* (1862); and others. He superintended the publication of the geographical and ethnographical magazine, *Bavaria*, and the *Historical Journal*. Died Nov. 16, '97.

RIEL, LOUIS, a Canadian insurgent; born at Boniface, Manitoba, Oct. 23, 1844. His father was a leader of the Metis (half-breed) Indians. In 1869, after completing his education at the Jesuit College in Montreal, Louis Riel became secretary of a national organization among the Metis, who resisted the Canadian authority in the Northwestern Territory, and afterward was presi-

dent of a provisional government formed by them at Fort Garry. On the approach of the force under Sir Garnet (afterward Lord) Wolseley, in 1870, Riel fled from the country, and a reward was offered for his apprehension. But he soon returned and was not molested. In 1873 he was elected to the Dominion Parliament, but he was not permitted to take his seat. After this he attempted twice to raise a rebellion. The second of these attempts, in March, 1885, was suppressed by General Middleton with Canadian troops. Riel was carried to Regina, where he was tried and convicted of treason-felony and sentenced to death. There was great excitement among the French Canadians over his execution, Nov. 16, 1885, as it was commonly believed by them that Riel was insane. See also RED RIVER, Vol. XX, p. 315.

RIF. See MOROCCO, Vol. XVI, p. 830.

RIFLES, MILITARY. See GUNMAKING, Vol. XI, pp. 282-285; and in these Supplements.

RIGDON, SIDNEY. See MORMONS, Vol. XVI, p. 826.

RIGG, JAMES HARRISON, an English Methodist theologian; born in Newcastle-on-Tyne, Jan. 16, 1821. He was educated at Old Kingswood School, and in 1845 entered the Wesleyan ministry and soon became one of the most energetic and effective defenders of Methodism. In 1868 he was elected principal of the Wesleyan Training College; in 1878 and 1892 elected president of the Wesleyan Conference. He was chairman of the Second London District Synod and member of the London School Board. Dr. Rigg was the English correspondent of the *New York Christian Advocate* (1858-76), and for many years edited the *London Quarterly Review*. Among his works are *Principles of Wesleyan Methodism* (1850); *Modern Anglican Theology* (1857); *The Churchmanship of John Wesley*; *Church Organization: Primitive and Protestant* (1887); and *The Centenary Life of Wesley* (1891). He contributed the article on METHODISM to this *ENCYCLOPEDIA*.

RIGGS, ELIAS, an American missionary; born in New Providence, New Jersey, Nov. 19, 1810. After studying at Amherst and Andover Seminary, he was sent, in 1832, by the American Board of Missions, to Athens, Greece. In 1838 he transferred his work to Smyrna, Asia Minor, where he remained till 1853. Afterward he labored in Constantinople. In 1857 he visited New York to have his translation of the Bible into the modern Armenian language stereotyped. During his stay he taught Hebrew in the Union Theological Seminary. He translated the Bible into the Bulgarian language and prepared a *Bible Dictionary* and *Harmony of the Gospels* in that language. He published *A Manual of the Chaldee Language* (1832); *Brief Grammar of the Modern Armenian Language*; *Vocabulary of Words Used in Modern Armenian*; *Notes on the Grammar of the Bulgarian Language*; *Outline of a Grammar of the Turkish Language* (1873); *A Bible Dictionary in Bulgarian* (1884); and numerous tracts and hymns in Greek, Armenian and Bulgarian.

RIGHT ASCENSION. See ASTRONOMY, Vol. II, p. 765.

RIGI, an isolated mountain of Switzerland, in the canton of Schwyz, between Lakes Lucerne, Zug and Lowerz. It rises 5,902 feet above the sea and 4,500 feet above the lake, and commands extensive views of some of the finest Swiss scenery.

RIG-VEDA. See SANSKRIT, Vol. XXI, pp. 275-276.

RIIS, JACOB A., a Danish-American journalist and writer on sociology; born May 3, 1849, at Ribe, Denmark. He acquired a knowledge of the English language by reading English novels, and removed to America in 1870. He was for a time a reporter on the New York *Tribune*, and later police-reporter in New York for the Associated Press, and as such became acquainted with tenement-life in the poorest and most squalid parts of the city. The results of these observations he published in 1890, under the title *How the Other Half Lives*, which attracted immediate attention. In 1892 followed *Children of the Poor*, and in the following year *Nisby's Christmas*, a collection of three stories, the title of the first of which gives the name to the book. Although fiction, they were written as sociological studies and with the philanthropical purpose of attracting attention to the miserable conditions under which life is supported in the crowded neighborhoods of the East Side.

RILEY, CHARLES VALENTINE, an English-American entomologist; born in London, Sept. 18, 1843. He was educated at Dieppe, France, and Bonn, Prussia; in 1860 removed to the United States; settling in Illinois, he became practically acquainted with farm-life, and edited an agricultural journal called the *Prairie Farmer*; in May, 1864, entered the army and served till the close of the war; in 1868 was made state entomologist of Missouri; and, with Benjamin D. Walsh, state entomologist of Illinois, published the *American Entomologist*, a monthly magazine; in 1877 he was appointed chief of the United States entomological commission which had been founded by the Department of the Interior to investigate the Rocky Mountain locust; in 1878 United States entomologist under the Department of Agriculture; in 1881 organized the entomological division of the Department of Agriculture, and thereafter continued in charge of that division, also holding the office of curator of insects in the United States National Museum. He presented to this museum his private entomological collection of over 115,000 mounted specimens, including about 15,000 species. He lectured on entomology at Cornell University, Kansas State Agricultural College, Washington University, and Missouri State University. This last institution conferred upon him, in 1873, the honorary degree of Ph.D. Professor Riley made valuable researches in the species of insects which are most destructive to American crops, such as the Rocky Mountain locust, the army-worm, the chinch-bug, the canker-worm, the cotton-worm, etc. He died Sept. 15, 1895, killed by a fall from his bicycle in Washington City.

RILEY, JAMES WHITCOMB, an American poet, born in Greenfield, Indiana, in 1853. His father was a well-to-do business man, and intended him for a profession; but he tired of school, ran away, and became an itinerant sign-painter; afterward acted in a wandering theatrical company, and became quite proficient in recasting old plays and improvising comic songs. About 1875 he began contributing prose and verse to the newspapers and magazines, and obtained employment on the Indianapolis *Journal*. One of his poems of this period, entitled *Leonainie*, written in imitation of Edgar Allan Poe, so closely resembled the latter's style that so keen a critic as William Cullen Bryant was deceived by it. Afterward Mr. Riley devoted his entire attention to writing and to giving readings of his poems, which were very popular, his home being in Greenfield, Indiana. Among his works are *The Old Swimmin' Hole*, and *'leven Other Poems* (1883); *The Boss Girl* (1886); *Character Sketches and Poems* (1887); *Afterwhiles* (1888); *Pipes o' Pan at Zekesbury* (1889); *Green Fields and Running Brooks* (1893); *Poems Here at Home* (1893); *Armazindy* (1894); and *A Child World* (1896). His poems mostly, or at least the most successful ones, are written in the Hoosier dialect, with which the poet was familiar from his earliest childhood, and describe the every-day life of the Hoosier farm and village. As a writer his style is uneven. Some of his verses are simple, tender and touching, others rather prosaic. His poetry, however, appeals to a popular taste, and the sale of his books has been large.



J. WHITCOMB RILEY.

RINDERPEST. See MURRAIN, Vol. XVI, pp. 59, 60.

RINDFLEISCH, GEORG EDOUARD. See PATHOLOGY, Vol. XVIII, p. 361.

RINEHART, WILLIAM HENRY, an American sculptor; born in Carroll County, Maryland, Sept. 13, 1825. In his boyhood he worked on his father's farm; became assistant to a stone-cutter of the neighborhood, and in 1846 went to Baltimore, where he continued in the same calling and also studied in the night art schools of the Maryland Institute. In 1855 he went to Italy to continue his studies, and there executed the two bas-reliefs, *Night* and *Morning*. On his return he opened a studio in Baltimore, and, besides other works, executed a fountain figure for the Post-Office in Washington, and the two figures, an *Indian* and a *Backwoodsman*, which support the clock in the House of Representatives. In 1858 he settled in Rome, and continued in the practice of his art. He died there, Oct. 28, 1874. Among his best-known works are *Woman of Samaria*; the statue of Chief Justice Roger B. Taney, in Annapolis, Maryland; the bronze statue, *Love Reconciled with*

Death, in the Greenmount Cemetery, Baltimore; *Clytie*, which he considered his masterpiece, and which is owned by the Peabody Institute; *Latona and Her Children*; and *Rebecca*, which is in the Corcoran Gallery in Washington.

RING-ARMATURE. See ELECTRICITY, § 80, in these Supplements.

RINGBONE, a hard, callous substance growing in the hollow circle of the little pastern of a horse, just above the coronet. The fact that it sometimes goes quite around like a ring gives it the name. The growth appears most commonly on overworked horses, but is occasionally seen on colts, or even on newly dropped foals. The effect, though not by any means invariable, is to stiffen the joint and spoil the animal for use. In any case, it injures the horse's market price. No cure for it is known.

RINGWORM. See SKIN DISEASES, Vol. XXII, p. 124.

RINK, HEINRICH JOHANN, a Danish explorer; born in Copenhagen, Aug. 26, 1819. He was educated at the Polytechnic School in Copenhagen, and in 1845-47 circumnavigated the globe with the *Galatea* exploring expedition, and examined particularly the Nicobar Islands, afterward publishing the result of his investigations under the title, *The Nicobar Islands* (1847). In 1848 he made a trip to Greenland and obtained a place in the Danish administration there. The greater part of the remainder of his life was spent in Greenland, making explorations and investigations concerning its physical features and its people. In 1877 he returned to Denmark as director of the Greenland trade. He published numerous works on Greenland; among them, *Danish Greenland*; *The Eskimo Tribes*; and *Geographical and Statistical Description of Greenland*. He died in December, 1894.

RIOBAMBA, the capital of Chimborazo, in the province of Ecuador, 103 miles S.S.W. of Quito, on a plain between the Chimborazo and Altar mountains. It was originally an Indian town, and was visited by a terrible earthquake on Feb. 4, 1797, in which 20,000 persons are said to have perished. Riobamba is a station on the road from Quito to Guayaquil. Population, 12,000.

RIO CUARTO, a town in the central part of the Argentine Republic, on the river Rio Cuarto, 119 miles S. by W. of Corboda. See RIO DE JANEIRO, Vol. XX, p. 562.

RIO DE JANEIRO, the capital of Brazil. Population 1888, 406,958. See RIO DE JANEIRO, Vol. XX, pp. 562, 563.

RIO DE LA PLATA. See PLATE, Vol. XIX, p. 187.

RIO DE ORO, a bay on the Atlantic coast of Africa, lying between the mainland and the Ed-Dajla Peninsula. It belongs to the Spaniards, and has a population of about 30,000.

RIO GRANDE, a post hamlet of Gallia County, southern Ohio, known only as the site of Rio Grande College, a co-educational institution of Free Baptist denomination, and having in 1896

6 instructors, 133 students and a library containing 1,000 volumes.

RIO GRANDE CITY, a village of Starr County, southern Texas, on the Rio Grande (navigable), 100 miles S.S.W. of San Diego. It has an extensive trade in hides and wool. The inhabitants speak Italian almost exclusively. Population 1890, 1,968.

RION, a river. See CAUCASUS, Vol. V, p. 253.

RIO NEGRO. See PATAGONIA, Vol. XVIII, p. 353.

RIO NEGRO, the most important tributary of the Amazon on the north side. It rises in Colombia, near lat. 2° N., long. 72° W. Its flow is east-southeast, enters the state of Pará, in Brazil, and joins the Amazon in lat. 3° 10' S., long. 59° W. The principal affluents are the Cababuri, Uanpes, Padarin and Rio Branco.

RIOUW-LINGGA, an archipelago in the China Sea, at the southern extremity of the Malay Peninsula, extending from lat. 1° 13' N. to 37° S., composed of the Riouw or northern group, and the Lingga or southern group. The first, separated from the mainland by Singapore Strait, consists of about thirty islands, the largest of which is Bintang; the second, separated from the preceding by the Strait of Dempo, consists of a number of small islands, and two larger ones, Lingga and Singkep. The total area of the archipelago is estimated at about 1,800 square miles. The surface of the islands is stony, and most of them are covered with thick forests. Tin has long been mined, but the deposits are now almost exhausted. Other productions include sago, rice, pepper and gambier. The population, made up of mixed races, is estimated at 80,000.

RIPLEY, a village of Brown County, southwestern Ohio, 10 miles S.S.E. of Georgetown, and 40 miles E.S.E. of Cincinnati, on the Cincinnati, Georgetown and Portsmouth railroad. It does a large tobacco business, and has manufactories of pianos and shoes. Population 1890, 2,483.

RIPON, a city of Fond du Lac County, eastern Wisconsin, 25 miles E. of Montello, and 20 miles W. of Fond du Lac, on the Chiago, Milwaukee and St. Paul railroad. It has several flour and planing mills, and marble-works, foundries and machine-shops, knitting-works and windmill factory. It is the seat of Ripon College, a co-educational, non-sectarian institution organized in 1863, which had, in 1896, 16 instructors, 175 students and a library containing 17,000 volumes. Population 1890, 3,358; 1895, 4,380.

RIPON (GEORGE FREDERICK SAMUEL ROBINSON), MARQUIS OF, an English statesman; born in London, England, Oct. 24, 1827. He succeeded to his father's and uncle's titles in 1859, and thus became Earl de Grey and Ripon. In the same year he became Under-Secretary for War, and in 1861 Under-Secretary for India. In 1863 he was made Secretary for War, with a seat in the Cabinet, and in 1866 Secretary of State for India. In 1871 he was chairman of the High Joint Commission which negotiated the Treaty of Washington. On his return to England he was rewarded

with the title of Marquis. On Sept. 4, 1874, he was admitted to the Roman Catholic Church at Brompton. When Gladstone returned to power in 1880, the Marquis of Ripon was made Viceroy of India, which office he held until 1884. In 1885-86 he was First Lord of the Admiralty, and in 1892 became Colonial Secretary in Mr. Gladstone's fourth administration,—a position he retained in Rosebery's Cabinet in 1894-95.

RIPPLE-MARKS. See GEOLOGY, Vol. X, pp. 293, 294.

RISING SUN, a town and the capital of Ohio County, southeastern Indiana, 11 miles S. of Lawrenceburg, on the Ohio River, and on the Cleveland, Cincinnati and St. Louis railroad. It has a graded school, a tannery, two steam flouring-mills and manufactories of furniture and plows. Population 1890, 1,689.

RISTIC OR RISTICH, JOHN, a Servian statesman; born in 1831, in Kragujevatz, and educated in Germany and in Paris. He held various minor appointments from the government of Servia until 1858, when he was made secretary of a deputation sent to Constantinople; later was made Servian minister there; in 1869 became Minister of Foreign Affairs, and after the assassination of Prince Michael in 1868, member of a council of regency to govern the country during the minority of Prince Milan. In 1872 the council became a ministry, Ristic holding the portfolio of Foreign Affairs. He held the same office during the disastrous war of 1877 with Turkey; was sent to the Congress of Berlin, and was very influential in securing the independence of Servia. Upon the abdication of King Milan in 1889, he again became a member of a council of regency, but when King Alexander reached his majority was dismissed from office and banished. Ristic was the leader of the party in Servia which favors Russia.

RISTORI, ADELAIDE. See GRILLO, MARQUISE DEL, in these Supplements.

RITCHIE, ANNA CORA MOWATT, an American actress, daughter of Samuel G. Ogden, a New York merchant; born in 1819, in Bordeaux, France, where she spent her childhood. At the age of 16 she married James Mowatt, a lawyer of New York. In 1845 she made her *début* as an actress, in New York, and soon after made a successful tour in England and the United States. In 1851 she lost her husband, and in 1854 she was married to William F. Ritchie, editor of the *Richmond Enquirer*, and retired from the stage. In 1860 she went to Europe, residing at first on the Continent, and afterward near London, where she died in 1870. Her works include *Pelayo*, a poetical romance (1836); *Gulzara, the Persian Slave*, a play (1840); *The Fortune-Hunter*, a novel (1842); *Fashion*, a comedy (1845), successfully represented in New York and London; *Evelyn*, a tale (1845); *Armand*, a play (1848); *The Autobiography of an Actress* (1854); *Mimic Life: Before and Behind the Curtain* (1855); *The Twin Roses* (1857); *Fairy Fingers*, a novel (1865); *The Mute Singer*, a novel (1866); *The Clergyman's Wife* (1867); and *Italian Life and Legends* (1870). She died at

Henley-on-Thames, July 28, 1870. Her *Autobiography of an Actress* is a graceful narrative of her experience.

RITCHIE, ANNE ISABELLA THACKERAY, an English novelist, daughter of the novelist William Makepeace Thackeray; born in Albion Street, London, in 1838. Several years of her childhood were spent in Paris, but she has passed the greater part of her life in Kensington. Her first published work was *The Story of Elizabeth* (1863), which was at once successful. This was followed in 1865 by *The Village on the Cliff; To Esther, and Other Sketches; Old Kensington*, the work by which she is best known; *Blue Beard's Keys; Toilers and Spinners; Miss Angel* (1875); *Anne Evans* (1880); *Madame de Sévigné* (1881); *A Book of Sybils* (1883); *Mrs. Dymond* (1885); *Lord Tennyson and His Friends* (1893); *Lord Amherst and the British Advance Eastward to Burmah* (1894); and *Chapters from Some Unwritten Memoirs* (1895).

RITCHIE, THOMAS, an American journalist; born in Essex County, Virginia, Nov. 5, 1778. He studied medicine and taught school, but in 1804 he found his proper element in editing the *Richmond Enquirer*. He was the editor and proprietor of this paper for over forty years, wielding an immense political influence, both in local and national politics. In 1845 he left the management of the *Enquirer* to his two sons, and, at the request of President Polk, founded and edited the *Washington Union* as the organ of the administration. On the accession of the Whig administration in 1840 he retired from the editorship of the paper. Ritchie was a firm supporter of the states' rights doctrine. He died in Richmond, July 12, 1854.

RITCHIE, SIR WILLIAM JOHNSTON, a Canadian jurist; born in Annapolis, Nova Scotia, Oct. 28, 1813. He was educated at the Pictou Academy, studied law, and was admitted to the New Brunswick bar in 1838; was made queen's counsel in 1854; puisne judge of the supreme court of New Brunswick in 1855; chief justice in 1865; puisne judge of the supreme court of the Dominion in 1875; chief justice of Canada in 1879. He was knighted in 1881; was deputy governor of Canada during the absence of Lord Lorne in 1881 and 1882; and was appointed deputy to the governor-general, Lord Lansdowne, in 1884. He died Sept. 25, 1892.

rites, CONGREGATION OF. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 630.

RITSCHL, ALBRECHT, a German theologian; born in Berlin, March 25, 1822. He was educated at Bonn and Halle; became instructor in the University of Bonn in 1846, afterward was professor of theology there until 1864, when he was appointed to the same chair at Göttingen. He wrote many works on the Lutheran doctrines, as *The Christian Doctrine of Justification and Reconciliation* (1870-74); *History of Pietism* (1880); *Theology and Metaphysics* (1881); *Instruction in Christian Religion* (1875); and *Origin of the Ancient Catholic Church* (1850). Ritschl was the founder of a

school of theologians who reject the doctrine of the trinity, incarnation, original sin, and other orthodox beliefs, and hold that the religious sense is the essential and ultimate fact in religion. He died March 20, 1889.

RITTENHOUSE, BENJAMIN, an American inventor and public man, brother of Daniel Rittenhouse, the astronomer; born in Norriton, Pennsylvania, in 1741. He learned the trade of clock and instrument maker, and in 1776 became superintendent of the gun factory established by the state of Pennsylvania; representative to the Pennsylvania assembly from 1784 to 1788; became associate judge of the court of common pleas of Montgomery County, Pennsylvania, in 1792. He made a surveyor's chain which has been used as a standard by the United States Land-Office. He was elected to the American Philosophical Society in 1789. He died in Philadelphia, Aug. 31, 1825.

RITTER, FRÉDÉRIC LOUIS, a German-American musician; born in Strasburg, Alsace, in 1834. He studied music at Paris and in Germany, and became, in 1852, professor of music in the Protestant Seminary at Fénéstrange, Lorraine. About 1856 he removed to the United States, settling at first in Cincinnati. Here he organized the Cecilia and Philharmonic societies. In 1862 he went to New York, becoming conductor of the Sacred Harmonic Society and of the Arion, a choral society for male voices. He instituted the first musical festival held at New York. In 1867 he was appointed professor of music at Vassar College, Poughkeepsie, New York. The University of New York conferred on him the degree of Doctor of Music in 1878. He composed the music for a number of songs, sacred and secular, and published several works on music, among which are *A History of Music* (1870-74); *Music in England* (1883); *Music in America* (1883); and *The Woman's College Hymnal*, with J. R. Kendrick. He died July 6, 1891.

RITUALISTS, the name given to a school of theologians in the English Church who advocate the adoption, by the modern church, of a ritual more nearly like that of the Roman Catholic Church than the service now used. The school is a modern development of the High Church party which has been in existence in England since the Reformation, and which has always tried to preserve the catholicity of the church from innovations by the various more radically Protestant sects to which the Reformation gave birth. The movement proceeded immediately from the Tractarianism of the earlier part of the century, and owes its origin to the impetus which that movement gave to the study of early ecclesiastical history. It first manifested itself in the introduction of choral services similar to those of the Roman Catholic Church, later in a more strict adherence to the letter of the Church Prayer-Book, which prescribes a liturgy more similar to the Roman Catholic liturgy than that previously in vogue in the Anglican Church, and lastly in a revival of the ancient pre-Reformation rites of the

English Church. The movement met with considerable opposition from the Low Church party, has been denounced as treasonable and Romanizing in its effects, and several of its leaders have been persecuted, although, as a rule, without success. One of the most notable cases was the trial of the Bishop of Lincoln, who, however, obtained a practical victory over his opponents. Ritualism has spread from the mother church in England to its American offspring, the Protestant Episcopal Church of America, and has been the cause of considerable discussion, notably in the Baltimore General Convention of 1871.

RITUAL OF THE DEAD, a collection of disconnected sacred writings, the whole or parts of which, in ancient Egypt, were placed near the dead when laid in the tomb. Sometimes they were inscribed on the walls of the pyramids or sarcophagi, and at others were written on papyri, and placed in the hand of the dead man or enveloped with the mummy clothes. This custom prevailed throughout the history of Egypt, traces of the Ritual being found occasionally written on the tombs of the fifth and sixth dynasties, and very frequently in those of later centuries, down to the age of the Ptolemies, the later transcriptions being usually made on papyrus rolls. The book, written in hieroglyphic or hieratic characters, consisted of a varying number of chapters, arranged without logical sequence, which contained advice and instruction that would be valuable to the dead man in his journey through the lower world, of which it gives a rather vague and confused description. A translation of the Ritual has been made by Renouf (1893-94), and Pierret's translation rendered into English by Charles H. S. Davis (1894).

RIVAS, a town of Nicaragua, and the capital of the department of the same name. It was the ancient town of Nicaraö, and most of its inhabitants are Indians. Population, about 10,000.

RIVERS. See GEOLOGY, Vol. X, pp. 272, 278.

RIVERS, PEARL, pseudonym of NICHOLSON, MRS. ELIZA JANE; q.v., in these Supplements.

RIVERS, RICHARD HENDERSON, an American Methodist Episcopal minister and educator; born in Montgomery County, Tennessee, Sept. 11, 1814. He was educated at La Grange College, Alabama, and after graduating in 1835 was chosen assistant professor in the institution, and in the following year professor; professor of moral science in Centenary College, Louisiana, in 1848; president in 1849; in 1854 made president of La Grange College; was president of several other Methodist Episcopal institutions of learning, and afterward held pastorates in Eufaula, Alabama, from 1878 to 1883, and in Louisville, Kentucky, from 1883 to 1887. He published *Mental Philosophy* (1871); *Moral Philosophy* (1871); *Our Young People* (1880); *Life of Bishop Robert Paine* (1884); and *Arrows from Two Quivers* (1890). He died June 21, 1894.

RIVER FALLS, a city of Pierce County, western Wisconsin, 10 miles S. of Hudson and 65

miles E. of Eau Claire, on the Kinnickinnick River, and the Chicago, Burlington and Northern and the Chicago, St. Paul, Minneapolis and Omaha railroads. It is in an agricultural district, and there is abundant power from the river for manufacturing. The principal manufactures are flour and starch. Population 1890, 1,783; 1895, 1,768.

RIVERHEAD, a village and the capital of Suffolk County, southeastern New York, at the mouth of Great Peconic Bay, on Long Island, next to the Shinnecock Hills, on the Long Island railroad. It has four grist-mills, a woolen-mill, two planing-mills, and manufactures of organs, carriages, straw paper and soap. Population 1890, 4,010.

RIVERSIDE, a city and the capital of Riverside County, southern California, nine miles S.S.W. of San Bernardino and 51 miles E. of Los Angeles, on the California Southern railroad. The products are oranges, lemons, figs, grapes and raisins. There are two libraries, several public and private schools, also two national banks, with a combined capital of \$200,000. Population 1890, 4,683.

RIVES, AMÉLIE, the maiden name of a Virginian novelist, granddaughter of William Cabell Rives; was born in Richmond, Virginia, Aug. 23, 1863, and passed her girlhood near Charlottesville, Albemarle County, Virginia. At an early age she exhibited a passion for art and literature. Her first production was a series of stories entitled *A Brother to Dragons* (1888), which showed imagination and a sort of untutored strength. This was followed, in the same year, by *The Quick or The*



AMÉLIE RIVES.

Dead? which brought the author into prominence as a writer of sensational fiction, "with a tendency to ridiculous extravagance in the representation of passion." Her later writings include *Virginia of Virginia* (1890); *Herod and Mariamne* a tragedy in blank verse (1889); *The Witness of the Sun* (1889); *According to St. John* (1891); and *Athelwold* (1893). In 1888 she married John Armstrong Chanler, a descendant of the first J. J. Astor, but they were divorced for incompatibility, and in 1896 she married Pierre Troubetskoi, the son of a Russian prince.

RIVES, WILLIAM CABELL, an American public man; born in Nelson County, Virginia, in 1793. He studied law with Thomas Jefferson. After serving in Congress from 1823 to 1829 he was sent as United States minister to France. From 1832 to 1845 he was United States Senator, with a brief interruption, and in 1849 he was again sent to France. In 1861 he was a member of the Confederate Congress. He was the author of *The Life and Times of James Madison* (3 vols.), and

some other works. He died near Charlottesville, Virginia, in 1868.

RIVIÈRE. See ITALY, Vol. XIII, p. 437.

RIVIÈRE, BRITON, an English painter; born Aug. 14, 1840, in London. He was educated at Oxford, and studied art at the same time, under his father, who was instructor in drawing there. In 1858 he exhibited, in the Academy gallery, *Sheep on the Cotswolds* and *On the Road to Gloucester Fair*, and after 1864 was a regular exhibitor in the Academy exhibitions. He was elected associate in 1878, and academician in 1881; obtained medals at the Philadelphia and Paris expositions. His pictures are characterized by delicacy and refinement in drawing and color. Among them are *Genius Loci* (1876); *The Poacher's Widow*, now in the Public Library, Birmingham; *Let Sleeping Dogs Lie* (1881); *Of a Fool and His Folly There is No End* (1889); *Daniel's Answer to The King* (1890); and *Rus in Urbe* (1890).

RIVIÈRE DU LOUP, a village of Temiscouata County, Quebec, Canada, on the Intercolonial and the Temiscouata railroads. It is on the river St. Lawrence, 125 miles below Quebec, and is the seat of Fraserville Institute, a convent and an academy. The inhabitants are nearly all French. Population 1891, 4,175.

RIVIÈRE DU LOUP, now **LOUISVILLE**, a village and the capital of Maskinongé County, Quebec, Canada, on the shores of Lake St. Peter, 65 miles below Montreal. It has manufactures of leather. Population 1890, 1,740.

ROAD, THE LAW OF THE, a term of two meanings, referring, in the first place, to the laws governing the meeting or passing of persons or vehicles upon the highways, and secondly, to the rules governing the sailing, steering or navigation of vessels upon navigable waters when meeting or passing each other. The American law of the road as to vehicles is exactly the opposite of that described in the English epigram:

"The law of the road is a paradox quite,

In riding or driving along:

If you go to the left, you are sure to go right

If you go to the right, you go wrong."

The American driver keeps to the right, the English to the left. As a general principle of law, when vehicles meet upon roads that cross, the one first reaching the intersection has the right of way, subject, invariably, to the proper and legitimate user of the highway by foot-passengers, for whose safety the driver of the vehicle is legally bound to observe caution.

In England, when one vehicle overtakes another, the latter gives way to the left, and the other passes on his right-hand side. The rules of the highroad, however, are all subject to the general principle of law that all persons traveling on the highway, whether riding, driving or walking, must use reasonable care and diligence to avoid collision.

In American cities, patrol-wagons of the police force, ambulances and fire-engines have the right of way, and are provided with warning-gongs. In England, fire-engines alone are thus favored.

The conveyance of the United States mails is protected and insured by Federal statutes, rendering it highly penal to obstruct their transport. These statutes confer a right of way upon mail carts and carriers. Lawful processions held under permit, the movement of state or Federal troops, and funeral *cortéges* also, have priority over ordinary traffic. Physicians are frequently given badges for the same purpose.

As to pedestrians, the rule of the road on both sides of the Atlantic is the same, to keep to the right. Under the provisions of the Highways and Locomotives Amendment Act, 1882, the quarter sessions in English counties, and the municipal authorities or local boards in towns and villages, have powers conferred upon them to pass by-laws regulating the use of bicycles and tricycles within their respective districts. Nearly every local authority passed similar by-laws which substantially provided for the carrying and sounding of a bell when overtaking any person or vehicle, the carrying of a lighted lamp after night-fall, moderation in speed, prohibition of racing, and reasonable rules for dismounting when restive horses are encountered. These by-laws are now enforced by the county councils. Similar municipal regulations are to be found in the principal cities and villages of America, and in each country the prohibition of riding upon the sidewalk is usual, and a violation is rendered penal.

The law or rule of the road at sea comprises the rules governing the navigation of vessels at sea, and the precautions required to avoid collisions. These matters, in the days of fast Atlantic vessels, and vast fleets of merchant vessels, have become questions of international regard and regulation. The tendency, the world over, is toward the adoption of a uniform system by all maritime countries. An International Maritime Conference met at Washington Oct. 16, 1889, for the purpose of discussing, revising and amending the rules, regulations and proceedings in relation to vessels at sea, and navigation generally. It remained in session until December 31st of the same year, and the report of its proceedings filled three large volumes. It recommended the adoption of a rule of the road at sea, corresponding closely to that which already existed. This rule was to go into effect March 1, 1895, and was generally adopted by Austria, France, Germany, the Netherlands, Portugal, Spain, Sweden and the United States. British objections, however, postponed the day of the universal international operation of the rule.

There are certain rules of navigation which have been adopted by the courts of all nations, and have the effect of positive law. They may be generally stated as follows: 1. When two sailing or steam vessels are approaching each other bow on, or nearly so, both helms must be put to port or left, so that each may pass on the port or left-hand side of the other; 2. When two sailing-vessels are crossing, and have the wind on different sides, the one with the wind on the starboard or right side shall have the right of way, unless she

is sailing with the wind free, and the other is closehauled, in which case the vessel with the wind free must give way to the other; 3. As a steamboat is deemed as always sailing with a free and fair wind, and capable of better control than a sailing-vessel, the former must always keep out of the way of the latter; 4. Every vessel overhauling another must keep out of the way of the latter; 5. A vessel clearing out of a harbor must make way for another vessel that enters; 6. When two steam-vessels approach each other on such a course that a collision is possible, each shall slacken speed, and if necessary, stop and reverse, and in a fog, steam-vessels must go at a moderate speed; 7. The master of a vessel entering a port or river where other vessels are lying at anchor is bound to make use of all proper checks to stop the headway of his vessel, in order to prevent accidents.

Although the foregoing are "rules," adopted for the general guidance of masters of vessels, they are subordinate to the rule prescribed by common sense, which is, that every vessel shall keep clear of every other vessel when she has the power to do so, notwithstanding that such other vessel may have taken a course in violation of the rules of navigation. In no case would a master be justified in keeping his course after it became apparent that to do so would result in a collision, if by changing such course without injury a collision could be avoided.

All vessels are required to display lights at night, whether sailing-vessels or steamboats, and whether under way or at anchor. These lights, and their arrangements, are such that the observer can tell whether they are carried by a sailing or steam vessel; whether the vessel is under way or at anchor; and if under way, the course the vessel is steering. The rules regarding lights are as follows: 1. Seagoing steamers while under way must display at the foremast-head a bright white light, on the starboard side a green light, and on the port side a red one. The side lights must be so arranged with inboard screens that they cannot be seen across the vessel's bow. 2. Steamers having other vessels in tow must display two white lights at the masthead, instead of one. 3. Sailing-vessels must display green and red side lights described above, but none at the masthead. 4. All vessels at anchor, whether propelled by wind or steam, must display, not more than twenty feet above the hull, a white light in a globular lantern eight inches in diameter.

In fogs, whether by day or night, steam-vessels under way must sound a steam-whistle at intervals of not more than one minute; sailing-vessels under way must sound a fog-horn at intervals of not more than five minutes; and when at anchor, both steamers and sailing-vessels must ring a fog-bell at intervals of not more than five minutes.

In maritime law, although the term *collision* is applied to all cases of vessels running foul, technically it only applies to the act of two vessels striking together; when one vessel strikes against another, it is called *allision*. In either case, the

injured parties have, under the general maritime law of all civilized nations, a claim against the offending vessel for any damage resulting. There may be a collision without actual contact, as where one vessel, by careless navigation, compels another to run ashore to escape greater peril. Collisions are usually classified as follows: 1. Those which occur without blame attaching to either vessel; as where the injury is occasioned by a storm. In such cases the misfortune must be borne by the party on whom it happens to light, the other not being responsible to him in any degree. 2. Those which arise where both vessels are at fault—where there has been a want of due diligence or of skill on both sides. In such cases, the law apportions the resulting damage between them, both having contributed to the injury. 3. Those in which the injured vessel is free from blame, and the collision is the result of negligence or violation of the rules of navigation by the other. In this class of cases, the offending vessel must respond in damages for all losses sustained. See also NAVIGATION, Vol. XVII, p. 277.

ROADS. See ROADS AND STREETS, Vol. XX, pp. 582-588; and HIGHWAYS, Vol. XI, pp. 811, 812.

ROADS, MOVEMENT FOR GOOD, IN THE UNITED STATES. The entire subject of road-making has been well and fully dealt with under ROADS AND STREETS, Vol. XX, pp. 582-588, though, in the main, the article deals with the roads of England and Europe. America's first roads were mere Indian trails, which skirted the watercourses, and crossed mountain ranges by convenient gaps. When the Pilgrims came to New England the towns took control of roads, and many an old New England record mentions roads, eight and ten rods wide, authorized by law, and of which but a portion was devoted to traffic.

The eighteenth century saw the introduction of turnpikes, many constructed and maintained by private companies, which were allowed to collect toll. These turnpike roads were probably the first instances of the use of gravel or broken stone for surface material. Congress, in 1796, authorized the construction of a national road from Baltimore westward. It ran for 650 miles, through Pennsylvania, Ohio and Illinois; its width was eighty feet, thirty of which consisted of broken stone. With the advent of the steam-railroad it fell into a bad state of repair, but is still known as a good, well-graded road.

The introduction of the bicycle in the United States soon crystallized public opinion in regard to the necessity of good roads. In 1885 an extensive agitation began, mainly produced by the efforts of Colonel Pope and the bicycle-riders of the country, and which produced very excellent results. The movement spurred county commissioners, township municipalities and selectmen, and borough counties to improve existing and construct fresh roads. The efforts of the League of American Wheelmen (q.v., in these Supplements) have been extensively directed toward the improvement of the American roads, and many public-spirited men have endeavored to convince

the farmer-taxpayer of the inevitable saving which will ensue from the improvement of all local roads. In 1892, and as a result of such agitation, the state of New York spent over two and a half million dollars in road-improvements in fifty counties, and repeated instances of amended highway legislation have occurred in the various state legislatures.

Literature has aided the effort, and an excellent work from the pen of N. S. Shaler, dean of the Lawrence Scientific School of Harvard University, appeared in 1896, under the title *American Highways: A Popular Account of their Conditions and of the Means by Which They may be Bettered*. It dealt with the subject of improved highroads from historical and existing aspects, contained much practical matter as to road-construction and cost, and included a useful bibliographical list of important works on the subject of highway-construction.

ROANOKE, a city of Roanoke County, southwestern Virginia, on the Roanoke River, 258 miles by rail W. of Norfolk, at the junction of the Shenandoah Valley and the Norfolk and Western railroad. It has extensive machinery, iron and steel works, locomotive and car shops, and a tobacco factory. It is in an iron-mining, tobacco-growing and live-stock section, and has a very good general trade. There are mineral springs of great medical value in the vicinity. Population 1890, 16,150.

ROANOKE COLLEGE, a non-sectarian institution of learning, founded in 1853, and situated in Salem, Virginia. The college offers a four years' course, which is partially elective. The grounds of the institution embrace twenty acres, and there are four buildings, one of which is a library containing 17,000 volumes. In 1895-96 there were 175 students in attendance; the number of instructors, 12. The total productive funds of the college amount to \$50,000, and its annual income, \$20,000.

ROANOKE RIVER, a stream of Virginia and North Carolina, formed by the union, at Clarks-ville, Virginia, of the Dan and Staunton rivers, which rise in the Alleghanies. It flows southeast, through the northeastern portion of North Carolina, and empties into Albemarle Sound. It is navigable for large vessels to Weldon, at the head of tide-water, 150 miles. Its length is 260 miles.

ROATAN, an island. See HONDURAS, Vol. XII, p. 131.

ROBBERY. See THEFT, Vol. XXIII, p. 233.

ROBERT II AND III, Scottish kings. See SCOTLAND, Vol. XXI, pp. 490, 491.

ROBERT COLLEGE, an American institution of learning in Constantinople, Turkey. It was founded and has been maintained largely by the gifts of Christopher R. Robert of New York, who, upon his death in 1878, left a bequest of one fifth of his estate to the institution. His total benefactions to it amount to nearly half a million dollars. The college was chartered under the laws of New York state as one of the colleges of the University

of New York, and was opened in a rented building in 1863, Rev. Cyrus Hamlin becoming its first president. Two buildings have since been erected, in 1871 and 1893. The college offers a regular academical course of five years, leading to the degree of bachelor, and a two years' preparatory course. Since its establishment, 1,715 students have attended the college, of which 274 have graduated.

ROBERT-FLEURY, the name of two French painters, father and son. JOSEPH NICOLAS, the father, was born in Cologne, Aug. 8, 1797. He studied art in Paris under Girodet, Gros and Horace Vernet; took a trip to Italy, and made his *début* as an artist in the Salon of 1824. He was made chevalier of the Legion of Honor in 1836; commander in 1867; elected member of the Academy of Fine Arts in 1850; in 1855 professor of the School of Fine Arts, of which he became later director; director of the Academy of France in Rome in 1865. Among his best-known works are *Massacre of St. Bartholomew*; *Conference at Poissy in 1561*; and *Jane Shore*,—all of which are in the Luxembourg; *The Entrance of Clovis into Tours*, at Versailles; and *The Institutions of the Juges Consuls*; *The Promulgation of the Ordinance of Commerce*, and others, in the new palace of the Tribunal of Commerce. He died in Paris, May 4, 1890.—TONY, born in Paris, Sept. 1, 1837; studied under Delaroche and Léon Cogniet; exhibited first in the Salon of 1866, where his *Varsovie, April 8, 1861*, representing a massacre in the Polish War of Independence, was awarded a medal. He was given the decoration of the Legion of Honor in 1873, and made officer in 1884; received the medal of honor in 1878; first-class medal at the exposition of 1878, a gold medal in that of 1889, and other marks of honor at different exhibitions. He painted largely historical subjects and portraits. Among his works are *Old Women of the Place Navona, Rome*, and *The Last Day of Corinth*, both in the Luxembourg; *Charlotte Corday at Caen*; *Portrait of M. Robert-Fleury*; and *The Billet-Doux* (1891).

ROBERTS, ELLIS HENRY, an American journalist; born in Utica, New York, Sept. 30, 1827; educated at Yale College, and, after graduating in 1850, principal of the Utica Academy; in 1851, proprietor of the *Utica Morning Herald*, a Whig journal; elected to the state legislature in 1867; to Congress in 1870; was a delegate to the national Republican conventions of 1864, 1868, and 1876; assistant United States Treasurer in New York City in 1889-93; was president of the Franklin National Bank of that city. He published *Government Revenue*, a course of lectures delivered at Cornell and Hamilton colleges in 1884, and *The Planting and Growth of the Empire State*, in the American Commonwealths Series (1887). Appointed Treasurer of the United States in 1897.

ROBERTS, HOWARD, an American sculptor; born in Philadelphia in 1843. He studied in the Pennsylvania Academy of Fine Arts, and in 1866 went to Paris and entered the École des Beaux-Arts. Returning to America, he opened a studio in

Philadelphia. His first important work was the statuette *Hester and Pearl*, the subject being taken from Hawthorne's *Scarlet Letter*. On the strength of this he was elected to the Philadelphia Academy. In 1873 he made another visit to Paris, and there executed *La Première Pose*, which was one of three pieces of American sculpture to win medals at the Centennial in Philadelphia. Among his other works are *Hypatia*; *Lucille*; and *Lot's Wife*. Roberts's ideal busts of childhood and womanhood have won the highest praise from the critics.

ROBERTS OF CANDAHAR, FREDERICK SLEIGH, LORD, an English soldier, son of Sir Abraham Roberts; born in 1832. He was appointed lieutenant in the Bengal artillery in 1851; captain in 1860; served with distinction in the Indian Mutiny, and received the Victoria cross; took part in the Abyssinian war in 1868 as assistant quartermaster-general, and obtained the brevet rank of lieutenant-colonel; in 1875 became quartermaster-general in India, with the local rank of major-general. In the Afghan war of 1878 he commanded the column sent to operate through the Koorum Valley, and, surmounting the difficulties of the Peiwar Pass, gained a brilliant victory at Charasiab and entered Cabul. On the investiture of Candahar by Ayoub Khan he rapidly performed the march from Cabul to Candahar, one of the most brilliant military feats of modern times, and utterly defeated the Pretender. For these services he was created a baronet in 1881. General Roberts was sent, in the same year, to take command of the forces against the Boers in South Africa, but was recalled on his arrival at Cape Town, in consequence of peace being made. He succeeded Sir Donald Stewart in the command of the Indian army in 1885. Lord Roberts's popularity with the troops was remarkable. Familiarly known by the soldiers' sobriquet of "Little Bobs" or "Bobs Bahadur," he figures in more than one of Rudyard Kipling's virile military poems. In 1892 he was raised to the peerage, and later was promoted to the rank of field-marshal.

ROBERTSON, GEORGE CROOM, a Scotch educator; born in Aberdeen, March 10, 1842; educated at Aberdeen Grammar School, and graduated M.A. in Aberdeen University in 1861. He was assistant professor of Greek in the University of Aberdeen from 1864 to 1866, and professor of philosophy and logic in University College, London, from December, 1866, until his death, Sept. 21, 1892. He was successively philosophical examiner in the University of London from 1868 to 1873, and again from 1883; in the University of Aberdeen (1869-72 and 1878-81); and in the University of Cambridge (1877-78). He was the editor of the journal *Mind* (1876-91); was the author of *Hobbes*, in Blackwood's Philosophical Classics (1887); contributed to the *Dictionary of National Biography*, and to this *ENCYCLOPEDIA* several articles, among them *ABELARD*, *ANALOGY*, and *ANALYSIS*.

ROBIN. See *FIELDFARE*, Vol. IX, p. 142; and *REDBREAST*, Vol. XX, pp. 314, 315.

ROBIN, CHARLES PHILIPPE, a French physician

and naturalist; born at Jasseron, department of Ain, June 4, 1821. He studied medicine in Paris. In 1847 he was made assistant professor of natural sciences on the Faculty of Medicine in Paris, and in 1862 professor of histology. He became celebrated for his microscopical researches in physiology. In 1864 he founded a journal on anatomy and physiology, in 1865 edited Nysten's *Encyclopædic Dictionary of Medicine*, and published *Cellular Anatomy and Physiology* (1873) and *A New Abridged Dictionary of Medicine* (1886). He died in Paris, Oct. 6, 1885.

ROBIN GOODFELLOW. See ROBIN HOOD, Vol. XX, p. 606.

ROBINSON, a city and the capital of Crawford County, southeastern Illinois, 27 miles S. of Marshall, and 27 miles W.S.W. of Terre Haute, Indiana, on the Cleveland, Cincinnati, Chicago and St. Louis and the Terre Haute and Indianapolis railroads. It is in a fruit, corn and wheat growing region, and has large wool interests. Population 1890, 1,387.

ROBINSON, BEVERLY, an American soldier; born in Virginia in 1723. He served with Wolfe in the storming of Quebec, as major, and when the American Revolution broke out remained loyal to the King, although he had opposed the oppressive measures of the British Cabinet. He removed to New York and raised the Loyal American Regiment, which he commanded as colonel. He was employed in negotiating with Benedict Arnold in regard to his treason, and the latter made Robinson's house his headquarters while matters were pending. After André's capture and conviction he was sent by Governor Clinton with the commission to pray for a mitigation of the sentence. After the close of the war Colonel Robinson went to New Brunswick and then to England, where he resided until his death, which occurred at Thornbury in 1792.

ROBINSON, CHARLES SEYMOUR, an American clergyman; born in Bennington, Vermont, March 31, 1829; graduated at Williams College in 1849, and studied theology at the Union Seminary, New York City, and at Princeton; became pastor of a Presbyterian church in Troy, New York, in 1855; in 1860, of a church in Brooklyn, New York; had charge of the American Chapel in Paris, 1868-70; 1870-87 was pastor of the Madison Avenue Presbyterian Church; 1890-92 of the Thirteenth Street Church; in 1892 of the New York Presbyterian Church. Dr. Robinson published a large number of hymn-books, and several works on religious subjects. Among them are *Songs for the Church* (1862); *Short Studies for Sunday School Teachers* (1868); *Chapel Songs* (1872); *Church Work* (1873); *Psalms and Hymns* (1875); *Studies in the New Testament* (1880); *Studies of Neglected Texts* (1883); *Laudes Domini* (1884); *Simon Peter* (1887); *From Samuel to Solomon* (1889); *New Laudes Domini* (1892); *Annotations upon Popular Hymns* (1893).

ROBINSON, EZEKIEL GILMAN, an American educator; born in Attleboro, Massachusetts, March 23, 1815. He graduated at Brown in 1838, and studied theology at Newton, Massachusetts. In 1842 he was ordained pastor of the Baptist church

at Norfolk, Virginia; and in 1846 was called to the Theological Seminary at Covington, Kentucky, as professor of Hebrew. He afterward had charge of a church at Cincinnati, and in 1852 he was made professor of Biblical theology in the Baptist Seminary at Rochester, New York, of which institution he became president in 1860. In 1872 he was chosen president of Brown University, at Providence, Rhode Island, which position he ably filled till 1889, when he resigned. From 1889 to 1894 he served as lecturer in Crozer Seminary, Pennsylvania, and in the latter year accepted the chair of ethics and apologetics in Chicago University. He died June 13, 1894. Among his works are a translation of Neander's *Planting and Training of the Christian Church* (1864) and *Principles and Practice of Morality* (1883).



E. G. ROBINSON.

ROBINSON, SIR FREDERICK PHILLIPSE, a British soldier, son of Beverly Robinson (q.v., in these Supplements); born in the Highlands, New York, in September, 1763. At the outbreak of the American Revolution he joined his father's Loyal American Regiment, and was given the rank of ensign; was wounded and taken prisoner by the Colonial troops in the battle of Stony Point, exchanged, and thereafter left the country. He served in the West Indies under Sir Charles Gore as captain; in the Peninsula under Wellington as brigadier; was commander-in-chief of the troops of the Upper Province of Canada during the War of 1812; knighted in 1815; governor of Upper Canada (1815-16); commander of the British forces in the West Indies, and was raised to the rank of lieutenant-general (1825); promoted to full rank of general in 1841. He died in Brighton, England, Jan. 1, 1852.

ROBINSON, SIR HERCULES GEORGE, a British diplomatist; born in 1824; educated at the Royal Military College at Sandhurst; held a commission in the army until 1846; was appointed President of the council in Montserrat in 1854; lieutenant-governor of St. Christophers (1855); governor of Hong Kong (1859); of Ceylon (1865); of New South Wales (1872); of New Zealand (1878); of the Cape Colony (1880). In 1874 he effected the annexation of the Fiji Islands, and was given the Grand Cross of the Order of St. Michael and George. He retired in 1889, and in 1890 was made baronet. In 1895 he was reappointed governor of the Cape and High Commissioner for South Africa. In 1896 he was elevated to the peerage.

ROBINSON, PHILIP STEWART, an English journalist and author; born at Chunar, in India, Oct. 13, 1849. He was educated at Marlborough College, and became, in 1869, subeditor on the *Pioneer*, of which his father was the editor. In 1872 he published some of the work contributed to that paper under the title *In My Indian Garden*. In

1872 was appointed editor of the Revenue Archives of the Benares Province; in 1877 joined the staff of the *Daily Telegraph*, and was one of its correspondents in the Afghan War (1878-79); in Zululand (1879); in Egypt (1882), and in the Sudan (1885). In 1881-82 he traveled in the United States, and published his experiences among the Mormons under the title *Sinners and Saints* (1883). Among his other works are *Under a Punkah* (1881); *Noah's Ark: Contributions to the Study of Unnatural History* (1882); *The Poets' Birds* (1883); and *The Valley of Teetotum Trees* (1886).

ROBINSON, STUART, an American Presbyterian clergyman; born in Strabane, Ireland, Nov. 14, 1814. He was brought to America when a child. He graduated at Amherst College, and studied theology at Princeton; held pastorates in Virginia, Kentucky and Baltimore. In 1856 he was called to the Danville Theological Seminary as professor of ecclesiology, but in 1858 he removed to Louisville, where he edited the *True Presbyterian*, and also ministered to a church. During the Civil War his paper was suppressed by the Union authorities, but afterward it was revived under the name of *The Free Christian Commonwealth*. He induced the synod of Kentucky to withdraw from the Northern Church and join the Southern. He published several volumes of sermons and discourses, among which was a lecture on *Slavery as Recognized by Mosaic Civil Law and as Recognized and Allowed by the Abrahamic, Mosaic and Christian Church* (1865). He died in Louisville, Oct. 5, 1881.

ROBINSON, THERESE ALBERTINA LOUISE (VON JAKOB), a German-American authoress; born in Halle, Jan. 26, 1797. For nine years she resided in Russia with her father, and upon her return published translations into German of Sir Walter Scott's *Old Mortality* and *Black Dwarf*. In 1828 she married Professor Edward Robinson (q.v., Vol. XX, p. 607), and went with him to America. Here she contributed to the *North American Review* and the *Biblical Repository*, the latter of which her husband edited. After her husband's death Mrs. Robinson lived in Hamburg, Germany. She published books in both German and English, under the pseudonym Talvj, an anagram of the initials in her maiden name. Among her works in German are *Volkslieder der Serben* (1826); *Die Unechtheit der Lieder Ossians* (1840); and *Die Colonisation von New England* (1847); among those in English, *Woodhill: or, the Ways of Providence* (1856); *Historical View of the Language and Literature of the Slavic Nations* (1850); and a posthumous work, entitled *Fifteen Years* (1870). She died in Hamburg, April 13, 1869.

ROBINSON CRUSOE. See DEFOE, Vol. VII, p. 28.

ROB ROY, the pseudonym of MACGREGOR, JOHN. (q.v., in these Supplements.)

ROBSON, STUART, an American comedian; born in Annapolis, Maryland, March 4, 1836. He became an actor in 1852, and a member of Laura Keane's company in New York in 1862. He was a partner of William H. Crane from 1877 to 1889, and after that time played the leading part in several comedies, especially in *Henrietta*.

ROBY, HENRY JOHN, an English scholar; born in Tamworth, Aug. 12, 1830; graduated at St. John's College, Cambridge, in 1853; was elected fellow, later lecturer and tutor, and held various offices in the university until 1861; was undermaster at Dulwich College (1861-65); held positions on government educational commissions (1864-74); in 1877 appointed life governor and member of the council of Owens College; was elected member of Parliament for Eccles in 1890, and re-elected in 1892. He published *Grammar of the Latin Language from Plautus to Suetonius* (1871-74); a school edition of the same in 1880; and in 1884 *Introduction to Justinian's Digest and Commentary*, which obtained for him the degree of LL.D. from Edinburgh.

ROCAMBOLE. See HORTICULTURE, Vol. XII, p. 287.

ROCHAMBEAU, JEAN BAPTISTE DONATIE DE VIMEURE, COUNT OF, a French general; born in Vendôme, July 1, 1725. He was educated for the priesthood, but, upon the death of his elder brother, entered the army in 1742. In 1749 he succeeded his father as governor of Vendôme, and served in the Seven Years' War, attaining the rank of brigadier. In 1780 he was made lieutenant-general, and put in command of the French troops sent to aid the American Revolutionists. He landed in Rhode Island and established his headquarters at Newport. In June, 1781, he marched toward the Hudson, defeated a detachment of Clinton's army on Manhattan Island, joined Washington's army and took part in the siege of Yorktown. After the close of the war he returned to France; was a deputy to the Assembly of Notables in 1788; repressed the riots in Alsace in 1790, and was created field-marshal in the following year; commanded the Army of the North, but resigned in 1792; was imprisoned in 1793; and owed his life to the fall of Robespierre. In 1804 he was created grand officer of the Legion of Honor. He died May 10, 1807. His *Memoirs*, written at his dictation, were published in 1809 in Paris, and translated into English by William E. Wright in 1838.

ROCHE, JAMES JEFFREY, an American journalist and poet; born in Mountmellick, Ireland, May 31, 1847. While he was an infant his parents moved to Prince Edward Island, and he was educated in St. Dunstan's College in that province. In 1866 he went to Boston, where he was engaged in commercial business for 17 years. In 1883 he joined the staff of the *Boston Pilot*, of which John Boyle O'Reilly was the editor-in-chief. After that time Mr. Roche contributed to the magazines both prose and poetry, and published several books, among which are *Songs and Satires*; *Story of the Filibusters*; *Life of John Boyle O'Reilly*; and *Ballads of Blue Water*. As a writer of light satirical verses and of ballads of the sea and of sea warfare, he had few equals among contemporaneous poets.

ROCHEFORT, VICTOR HENRI, a French journalist and politician; born in Paris, Jan. 30, 1830. At the age of 22 he began to contribute dramatic and art criticisms to the *Figaro*, of whose staff he became a member. But he gradually turned to caustic satire of the Imperial administration. These

sketches were afterward collected into three volumes: *Les Français de la Décadence* (1866-68). On



HENRI ROCHEFORT.

account of his liberal opinions he had to leave the *Figaro*. In June, 1868, he founded *La Lanterne*, in which he so bitterly attacked the empire that the journal was suppressed in August of the same year and Rochefort was condemned to one year's imprisonment and \$2,000 fine. He fled to Belgium before the sentence was pronounced, and there resumed the publication of *La Lanterne*, which was circulated surreptitiously in France. In November, 1869, he was elected to the Corps Législatif, whereupon he proceeded to Paris. He then founded *La Marseillaise* in Paris, whose attacks on the Imperial family provoked Prince Pierre Bonaparte to kill, in a duel, Victor Noir, Rochefort's assistant. In 1870 Rochefort was sentenced to six months' imprisonment and \$690 fine for violent language. He remained in prison until the fall of the empire after the battle of Sedan. This restored him to liberty, and gave him a place in the government of national defense. In February, 1871, he founded *Le Mot d'Ordre*, and was elected deputy. He instigated some of the worst excesses of the Communists, and was arrested and sentenced to imprisonment for life in a fortress. In 1873 he was transported to New Caledonia, a French penal colony in the South Pacific Ocean. But some months later he escaped to an American vessel, and was taken to San Francisco. Thence he made his way to Geneva, where he resided until the general amnesty of 1880 permitted him to return to Paris. There he founded a new radical paper, *L'Intransigeant*. He was elected to the Chamber in 1885, but resigned a few months after; was a supporter of Boulanger in 1888, and in the following year was convicted of treason by the Senate, but escaped to London, where he remained until 1895, when he was allowed to return to Paris. He published a number of farces, novels, satires, etc. An interesting, if somewhat egotistical, account of the incidents of his eventful career, including the narrative of his prison experiences, appeared in 1896 in *The Adventures of My Life*, an autobiography, arranged for English readers by the author and Ernest W. Smith.

ROCHELLE, a city of Ogle County, northwest Illinois, 73 miles W. of Chicago and 25 miles S. of Rockford, on the Chicago and North-Western and the Chicago, Burlington and Quincy railroads. It manufactures disk harrows, tile and bricks, barbed wire and oatmeal. The surrounding country is devoted to farming. Population 1890, 1,789.

ROCHESTER, a town and the capital of Fulton County, northern central Indiana, 19 miles S. of Plymouth and 24 miles N.N.W. of Logansport, on the Chicago and Erie and the Lake Erie and Western railroads; also on the outlet of Lake Manitou. It uses the water-power from the lake, and contains

several flour and grist mills. It ships great quantities of grain, flour and produce. Population 1890, 2,467.

ROCHESTER, a city and the capital of Olmsted County, southeastern Minnesota, on the Zumbro River, 35 miles S. of Red Wing and 35 miles N.W. of Preston, on the Chicago and North-Western railroad. It is the center of a great grain-growing region and has large dairying and horse-breeding interests, and water-power from the river is utilized in manufacturing. There are flour and grist mills, elevators, foundries and machine-shops; also the second Minnesota Hospital for the Insane and a Roman Catholic convent, called Notre Dame de Lourdes. Population 1890, 5,321; 1895, 6,429.

ROCHESTER, a city of Strafford County, southeastern New Hampshire, on Salmon Falls, the Cocheco River, and on the Boston and Maine and the Portland and Rochester railroads. It has manufacturing of shoes and woolen goods, a library, founded in 1792, and a national bank, with a capital of \$100,000. Population 1890, 7,396.

ROCHESTER, a city of New York, is on the New York Central and Hudson River, the Rochester division of the Erie, the Northern Central, the Buffalo, Rochester and Pittsburg and other railroads.

Rochester has 2,500 manufacturing establishments, employing 40,000 people. The value of its manufactured products per annum is \$200,000,000. The capital invested in manufacturing and the wholesale trade amounts to \$35,000,000. For many years Rochester's development was slow, but during the last decade the city has taken a tremendous stride forward. Since 1880 1,400 new industries have sprung up. The result has been a rapid extension of the limits of the manufacturing district, and the establishment of large factories in places remote from the river-banks. East Rochester has developed into a thriving manufacturing section, with a number of large plants. Some of Rochester's finest public buildings are the courthouse, city hall and Free Academy, in the heart of the town; the Government Building and the State Arsenal, with the Soldiers' Monument in front of it, the Lyceum Theater and the Eureka Club-house.

The general improvement of the city has of late years been very marked. The artistic side of life has not been neglected, and while, like many comparatively new cities, the streets of Rochester are noticeably bare of statuary, in the Powers Art Gallery a really valuable selection of paintings and *objets d'art* has been gathered. The collection is valued at upward of one million dollars. The number of paintings in the collection is nearly one thousand, while numerous superb examples of statuary, with expensive bric-à-brac and rare vases, add to the attractions of the gallery.

The assessed valuation of Rochester for the year 1891 was as follows: Real estate, \$93,779,400; personal estate, \$6,177,450; total, \$99,956,850. Population 1892, 146,312. See also ROCHESTER, Vol. XX, p. 614.

ROCHESTER, a borough of Beaver County, western Pennsylvania, 2½ miles N. E. of Beaver; on the Pittsburg, Fort Wayne and Chicago and the

Pittsburg, Youngstown and Ashtabula railroads. It is in a fire-clay as well as a coal, oil and building-stone region. Population 1890, 3,649.

ROCHESTER, UNIVERSITY OF, a non-sectarian institution of higher learning founded in 1850 by several of the citizens of Rochester, New York, where it is situated. The original campus, which has since been enlarged to 24 acres, was the gift of the Honorable Azariah Boody. There are three large buildings, Anderson Hall, the first building, and Sibley Hall and the Reynolds Chemical Laboratory, given by the men whose names they bear.



ANDERSON HALL, UNIVERSITY OF ROCHESTER.

The productive funds of the university amounted to \$621,625 in 1896, and the annual income to \$44,457. There were 190 students in attendance and 17 instructors. The library contains 29,700 volumes, and the geological collections owned by the institution, the original Ward collections, are among the best in the United States. The university offers four courses, classical, Latin-scientific, Greek-scientific and scientific, besides special courses for graduate students. There are no dormitories connected with the institution.

ROCHET, LOUIS, a French sculptor; born Aug. 24, 1813, in Paris. He studied under Pierre Jean David, and began to exhibit in 1835. His works include *Compte Ugolino et ses Enfants*; *Jeune Femme Pleurant*; *Napoléon Bonaparte*; the large equestrian statue of *Dom Pedro I*, erected at Rio de Janeiro in 1862; the statue of *Marshal Drouet* in the Versailles Museum; and of *Madame de Sévigné*. He died Jan. 21, 1878.



J. D. ROCKEFELLER.

ROCK-CHUTE SYSTEM. See COAL, in these Supplements.

ROCK-CRYSTAL. See MINERALOGY, Vol. XVI, p. 389.

ROCKEFELLER, JOHN DAVIDSON, an American capitalist; born in Richford, Tioga County, New York, July 8, 1839. At

an early age he removed with his parents to Cleveland, Ohio; was educated in its public schools, and later employed by the firm of Hewitt and Tuttle in that city until he was 19, when he entered business on his own account. He evinced great aptitude for

affairs, and from very small beginnings soon began to get rich. In 1860, when petroleum discoveries created the "oil fever," he was proprietor of a refinery in Cleveland with a modest capital. His business developed until he became president of the Standard Oil Company, a monopolistic corporation formed in 1870, through which he became enormously rich. In 1889 he reconstructed Chicago University, and gave it various amounts till the institution's endowment was \$5,500,000. He also gave liberally to other public and religious objects.

ROCKET OR HESPERIS. See HORTICULTURE, Vol. XII, p. 251.

ROCK FALLS, a village in Whiteside County, northern Illinois, 11 miles S.W. of Dixon, and 110 miles W. of Chicago, on the Chicago, Burlington and Quincy R.R. It has numerous manufacturing establishments, including foundries and machine-shops, furniture and agricultural-implement factories, flour and paper mills. Population 1890, 1,900.

ROCK-FISH OR ROCK, the *Roccus lineatus*, a fish abundant in northern United States. In New York it is called striped bass because of the longitudinal dark-colored bands on the sides of the body. It is essentially marine, but it ascends rivers sometimes to perfectly fresh water. It is one of the finest food-fishes. On the California coast the name is inappropriately given to two species of *Sebastes*, which are very abundant, and excellent food-fishes. See also CALIFORNIA, Vol. IV, pp. 703, 704.

ROCKFORD, a city and the capital of Winnebago County, in the state of Illinois. The census of 1890 showed the following: 246 manufacturing establishments, with a combined capital of \$7,715,069, employing 5,223 persons, paying \$2,474,703 for wages and \$4,248,001 for materials, having their products valued at \$8,888,904. The manufacture of agricultural implements is the principal industry. There are now 10 establishments of this kind. Population 1880, 13,129; 1890, 23,584. See also ROCKFORD, Vol. XX, p. 615.

ROCKHAMPTON, a seaport city of Queensland. Vessels of 1,500 tons come up to the wharves, while larger ships land at Port Alma, 36 miles below. The surrounding country has gold, silver and copper. Peak Downs and Mount Morgan are the two most important workings. Population 1891, 11,600. See also ROCKHAMPTON, Vol. XX, p. 615.

ROCKHILL, WILLIAM WOODVILLE, an American traveler and diplomat; was born in Pennsylvania, and early in life entered the United States consular service as second secretary of legation at Pekin, China. From that time until 1892 he traveled or resided in the Orient, studying the geography of the country and the ethnology of the inhabitants. In 1893 he was appointed chief clerk of the Department of State at Washington; Third Assistant Secretary in 1894 and First Assistant in 1896. His works include: *Udanabarga: A Collection of Verses from the Buddhist Canon* (1883); *The Life of the Buddha* (1884); *Diary of a Journey Through Mongolia and Tibet* (1894); and *Notes on the Ethnology of Tibet* (1895). Appointed Minister to Greece in '97.

ROCKINGHAM, a village and the capital of Richmond County, southwestern North Carolina, 83

miles S.W. of Raleigh, on the Seaboard Air Line and the Richmond and Danville railroads. It has an academy and a cotton-mill. Population 1890, 1,870.

ROCKINGHAM, a hamlet and capital of Windham County, southeastern Vermont, on the Williams River, and 29 miles S. of Woodstock, on the Central Vermont railroad. It contains three paper-mills and two woolen-mills; also a cotton-mill. Population 1890, 4,579.

ROCK ISLAND, a city and the capital of Rock Island County, northwestern Illinois, on the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific and the Rock Island and Peoria railroads. It has manufactures of agricultural implements, window-glass and cotton goods. Augustana College (Lutheran), which is here, is a co-educational institution, founded in 1860, and had in 1890 24 instructors, 509 students and a library containing 15,000 volumes. Population 1890, 13,600. See also ROCK ISLAND, Vol. XX, p. 616.

ROCKLAND, a city, a seaport and the capital of Knox County, Maine, on the Maine Central railroad, and is a stopping-point of the Bangor and Boston steamboats. Granite-quarrying, ship-building and the manufacture of clothing are the principal industries. Population 1890, 8,174. See also ROCKLAND, Vol. XX, p. 616.

ROCKLAND, a town of Plymouth County, eastern Massachusetts, 18 miles N.W. of Plymouth, on the New York, New Haven and Hartford railroad. It has extensive boot and shoe and tack factories; also a public library. Population 1890, 5,206; 1895, 5,523.

ROCKPORT, a village and the capital of Spencer County, southwestern Indiana, 28 miles E. of Evansville, on the Louisville, Evansville and St. Louis railroad. It has basket, chair and furniture factories; also flour and lumber mills. Extensive coal-mines are here. The village is surrounded by the most extensive tobacco-growing district of the state. Population 1890, 2,314.

ROCKPORT, a town of Essex County, northeastern Massachusetts, 32 miles N.E. of Boston, at the mouth of Cape Ann, on the Boston and Maine railroad. Its principal industries are the manufacture of isinglass and sand-paper; there are also granite-quarrying, fisheries and agriculture. Population 1890, 4,480.

ROCKPORT, a town and the capital of Aransas County, southeastern Texas, on Aransas Bay, 173 miles S.W. of Galveston, on the San Antonio and Aransas Pass railroad. It is in an agricultural, fruit-growing and stock-raising region, and does a large business in oysters, fish and turtles. It is also a popular summer resort. Population 1890, 1,069.

ROCK RAPIDS, a village and the capital of Lyon County, in northwestern Iowa, 56 miles N.W. of Cherokee, on the Burlington, Cedar Rapids and Northern and the Chicago, St. Paul, Minneapolis and Omaha railroads. This place is situated in a farming district, and has flour-mills and grain-elevators. Population 1890, 1,394; 1895, 2,112.

ROCK ROSE, a name given in general to species of the family *Cistaceae*, but particularly to the

showy *Cistus ladaniferus* of Europe. The American representatives are species of *Helianthemum* (frostweeds), *Hudsonia* and *Lechea* (pinweeds), all of sandy woods and fields.

ROCKS. See GEOLOGY, Vol. X, pp. 229-239.

ROCK-SNAKE. See PYTHON, Vol. XX, p. 144.

ROCK SPRINGS, a town of Sweetwater County, in southwestern Wyoming, on Bitter Creek, and on the Union Pacific railroad. This place is known principally as a coal-mining region, there being here several beds of good lignite 9 to 14 feet thick. The various mines employ over twenty-five hundred men. Population 1890, 3,406.

ROCKSTRO, WILLIAM SMYTH, an English pianist, musical composer, author and teacher; born in 1830. He arranged and edited various classical operas and was known as a voluminous composer of salon pieces, such as *Christabel*, and others. His other works include *Abbey Lands: A Tale* (1857); *The Choristers of St. Mary's* (1858); *A History of Music* (1879); *Practical Harmony for Students* (1879); *The Life of George Frederick Handel* (1883); *Mendelssohn* (1883); *A General History of Music from the Infancy of the Greek Drama to the Present Period* (1886). He wrote many articles for this *ENCYCLOPEDIA*, including MENDELSSOHN, MOZART, PLAIN SONG, WAGNER, RICHARD WEBER, etc.

ROCKVILLE, a city of Tolland County, northern Connecticut, 12 miles W. of Tolland and 22 miles E.N.E. of Hartford, on the Central Vermont railroad. The more important industries are paper, woolen, silk and cotton mills. Population 1890, 7,772.

ROCKVILLE, a village and the capital of Parke County, western Indiana, 55 miles W. of Indianapolis, on the Chicago and Eastern Illinois railroad. It has a graded school, an iron-foundry and woolen and flour mills. Coal is found in this vicinity. Population 1890, 1,689.

ROCKVILLE, a village and the capital of Montgomery County, central Maryland, 14 miles N. of Washington, District of Columbia, on the Baltimore and Ohio railroad. It is in an agricultural district, and has a courthouse, a jail and a weekly paper. Population 1890, 1,568.

ROCKWOOD, a town of Roane County, southeastern Tennessee 20 miles E. of Crossville, 40 miles W. of Knoxville, on the Rockwood and Tennessee railroad. It is in an iron and coal mining district, and contains several blast-furnaces. Population 1890, 2,429.

ROCKY MOUNTAIN GOAT (*Haplocerus montanus*), a true antelope which inhabits the mountains from Colorado to British Columbia. Its hair is white, and a beard on the throat gives some resemblance to a goat. It is the only American form, but allied forms are found in southern Asia. See also ANTELOPE, Vol. II, p. 102.

ROCKY MOUNTAIN SHEEP, a name sometimes given to the big-horn (*Ovis montana*). It ranges from the Mexican boundary to Alaska. The animal is very active, and its flesh is excellent food. See also SHEEP, Vol. XXI, p. 785.

RODENTIA or GLIRES. See MAMMALIA, Vol. XV, pp. 415-420.

RODGERS, CHRISTOPHER RAYMOND PERRY, an

American naval officer; born in Brooklyn, New York, Nov. 14, 1819. He entered the United States navy as midshipman in 1833; commanded the *Phoenix* in the Seminole war in 1839-41; distinguished himself in the siege of Vera Cruz and in the capture of Tuxpan and Tabasco, in the Mexican War; was raised to rank of commander in 1861; took part in the battle of Port Royal, in the capture of Fort Pulaski, and commanded the *New Ironsides* in the south Atlantic blockading squadron; was made captain (1866), commodore (1870), rear-admiral (1874); chief of the Bureau of Yards and Docks (1871-74); superintendent of the United States Naval Academy (1874-77); commanded the Pacific squadron (1877-80) and retired in 1881. He died in Washington, Jan. 8, 1892.

RODGERS, JOHN, an American naval officer; born in Harford County, Maryland, Aug. 8, 1812. He commanded, in 1853-56, the steamer *John Hancock* in an exploring expedition in the North Pacific. In May, 1862, he conducted an expedition of gunboats on the James River, and attacked Fort Darling. In June, 1863, with the monitor *Weehawken*, he captured the Confederate ironclad *Atlanta* near Savannah, Georgia. For this exploit he was made commodore. In 1869 he was promoted rear-admiral, and had command of the China fleet. In August, 1871, he captured the Korean forts and put an end to the outrages which the Koreans had committed on American commerce. In 1873-77 he had command of Mare Island navy-yard at San Francisco. In 1877 he was made superintendent of the United States Naval Observatory at Washington, and chairman of the Lighthouse Board. He died in Washington, District of Columbia, May 12, 1882.

RODIN, AUGUSTE, a French sculptor; born in Paris in 1840; from 1864 to 1870 he was employed as a marble-worker in the studio of Carrier-Belleuse; for seven years thereafter was engaged with a Belgian artist in the decoration of the Chamber of Commerce at Brussels; exhibited for the first time in the Salon of 1875; in 1877 produced a statue in plaster, *The Age of Brass*, which attracted a great deal of criticism, favorable and otherwise, and has been cast in bronze for the Luxembourg Gardens; was decorated with the Legion of Honor in 1888. His work is startlingly original and unacademical, intensity of action being its predominant characteristic. Among his best-known pieces are *Saint Jean-Baptiste Prêcheur*, in the Luxembourg; bronze bust of Victor Hugo; *Le Baiser*, a group for the door of the Palace of Decorative Arts, representing Francesca de Rimini and Paolo Malatesta; besides a number of portrait-busts of eminent men.

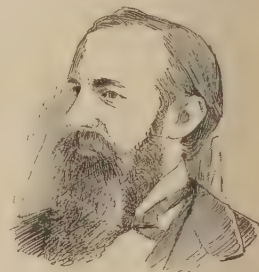
RODMAN, THOMAS JEFFERSON, an American inventor; born in Salem, Indiana, July 30, 1815. After graduating at West Point in 1841, he entered the Ordnance Department and devoted himself to experimenting with guns and gunpowder. He soon invented a method of casting guns hollow and cooling them from the inside. He also invented the 15-inch and 20-inch smooth-bore guns, and introduced the use of "mammoth" powder for these guns. During the Civil War Rodman's guns were used by the navy as well as the army. He had com-

mand of the Watertown arsenal till 1865, when he became engaged at Rock Island, where he constructed an arsenal on Government Island. In 1867 he was promoted to lieutenant-colonel. He was the author of a valuable *Report of Experiments on Metals for Cannon and on Cannon-Powder* (1861). He died at Rock Island, Illinois, June 7, 1871.

RODNEY, CÆSAR, a signer of the American Declaration of Independence; born in Dover, Delaware, Oct. 7, 1728. In 1765 he was delegate to the Stamp Act congress, and in 1775 to the Continental Congress, in which capacity he signed the Declaration of Independence. He served as brigadier-general under Washington in the New Jersey campaign in 1776-77; defended Delaware from British invasion; and soon after was made major-general of the Delaware militia. From 1776 to 1782 he was president or executive officer of Delaware. In 1782 he was elected to Congress, and again in 1783, but he did not take his seat. He had for many years been suffering from a cancer in the face, which ultimately caused his death, in Dover, June 29, 1784.

RODNEY, CÆSAR AUGUSTUS, an American public man, nephew of Cæsar Rodney; born in Dover, Delaware, Jan. 4, 1772. He graduated at the University of Pennsylvania, studied law and was admitted to the bar of Wilmington, Delaware, in 1793. From 1803 to 1807 he was a member of Congress; from 1807 to 1811, Attorney-General of the United States, and during the War of 1812 commanded an artillery company which served on the Canadian frontier. In 1821-22 he was a member of Congress, and in 1822-23 United States Senator. In the latter year he became first United States minister to the United Provinces of La Plata. While discharging the duties of this position he died in Buenos Ayres, June 10, 1824. He published, with J. Graham, *Reports on the Present State of the United Provinces of South America* (1819).

ROE, EDWARD PAYSON, an American author; born in New Windsor, Orange County, New York, March 7, 1838. He was educated at Williams, but did not graduate. Later he studied at Auburn and at Union Theological Seminary in New York City, and from 1862 until 1865 was a chaplain of volunteers in the Union army. Thereafter he became settled as pastor of a Presbyterian church at Highland Falls, New York, and in 1874



E. P. ROE.

removed to Cornwall, on the Hudson River, and engaged in the culture of small fruits. He was the author of a number of light novels which have had large sales. Among them are *Barriers Burned Away*, a story of the Chicago fire (1872); *The Opening of a Chestnut Burr* (1874); *Near to Nature's Heart* (1876); *Nature's Serial Story* (1884); and *Miss Lou* (1888). He died in Cornwall, New York, July 19, 1888.

ROEBLING, WASHINGTON AUGUSTUS, an American mechanical civil engineer; born in Saxenburg,

Pennsylvania, May 26, 1837; the son of the famous bridge-builder, John Augustus Roebling (q.v., Vol. XX, p. 619). He was working under his father at Pittsburg when the war broke out. In 1861 he enlisted in a New York artillery company. On the staff of General Pope he served as military engineer, bridge-builder and aeronaut, rising to the rank of major. In January, 1865, he resigned and resumed work with his father, who was then building the railroad suspension-bridge at Cincinnati. On the death of his father in 1869, he finished the plans for the Brooklyn bridge and superintended its construction. After completing the latter in 1883 he was chiefly engaged in managing the wire factory at Trenton, New Jersey. He published *Military Suspension-Bridges* (1862).

ROE-DEER. See DEER, Vol. VII, p. 24.

ROENTGEN RAYS OR RÖNTGEN RAYS AND PHOTOGRAPHY. See ELECTRICITY, § 96, and PHOTOGRAPHY, in these Supplements.

ROGERS, HENRY DARWIN, an American geologist; born in Philadelphia, Pennsylvania, Aug. 1, 1808. He was made professor of natural philosophy in Dickinson College, Carlisle, in 1830, and was afterward, for many years, professor of geology in the University of Pennsylvania. He conducted a geological survey of New Jersey in 1835-36, and one of Pennsylvania, on which he was engaged from 1836 till 1855. In 1858 was appointed regius professor of natural history at the University of Glasgow. Besides five annual reports, he prepared a final report under the title *The Geology of Pennsylvania* (3 vols., 1858, with seven large maps). This work was published at the expense of the state of Pennsylvania. He died near Glasgow, Scotland, May 29, 1866.

ROGERS, HENRY WADE, an American educator; born in Holland Patent, New York, Oct. 10, 1853; graduated at the University of Michigan in 1874; studied law and was admitted to the bar in 1877; became professor of law in the University of Michigan in 1883; dean of the law school in 1885; was chosen president of Northwestern University, Evanston, Illinois, in 1890. He wrote *Illinois Citations* (1880) and *Expert Testimony* (1883), and edited, in 1887-89, *The American Law Register*.

ROGERS, JAMES BLYTHE, an American chemist; born in Philadelphia, Feb. 11, 1802. He was educated at William and Mary College, studied medicine and began practice in Lancaster County, Pennsylvania, but soon moved to Baltimore and became the manager of a manufactory of chemicals; was chosen professor of chemistry in Washington Medical College, Baltimore; in 1835 was called to the same chair in the medical department of Cincinnati College; in 1840 settled in Philadelphia and assisted his brother, Henry Darwin Rogers (q.v., in these Supplements), in his geological survey of

Pennsylvania; in 1847 was chosen professor of chemistry in the University of Pennsylvania. He edited, with his brother Robert, Gregory's *Outlines of Organic Chemistry* and Turner's *Elements of Chemistry*. See *Memoir* of his life by Dr. Joseph Carson (1852). He died in Philadelphia, June 15, 1852.

ROGERS, JAMES EDWIN THOROLD, an English publicist; born in Hampshire in 1823. He was educated at Oxford and entered the church; in 1862 was chosen professor of political economy at Oxford, and in 1868 was obliged to leave on account of his radicalism; was returned to Parliament for Southwark in 1880, and from Bermondsey in 1885; reinstated at Oxford in 1888. He wrote *History of Agriculture and Prices in England* (6 vols., 1866-88), his greatest work; *Cobden and Modern Political Opinion* (1873); and *Industrial and Commercial History of England* (1892). He died in Oxford, Oct. 13, 1890.

ROGERS, JOHN, an American sculptor; born in Salem, Massachusetts, Oct. 30, 1829. He was educated at the Boston High School and went to work in a mercantile house in that city, but his eyes giving out, he entered a machine-shop at Manchester, New Hampshire; in 1856, was put in charge of a railroad repair-shop at Hannibal, Missouri, and there cultivated a taste for modeling in clay, which led him to go to Europe, in 1858, and study art. He returned in 1859, went to Chicago, and there modeled a group, *The Checker-Players*, which attracted considerable attention. After that he modeled and cast in composition a great many statuette groups on subjects taken from incidents in the Civil War and from every-day life. These have been sold extensively, and were very successful in touching the popular taste. Among them are *The Slave Auction*; *Picket Guard*; *One More Shot*; *Coming to the Parson*; *Going for the Cows*; *The Favorite Scholar*; and a series of three groups, illustrating Irving's *Legends of Sleepy Hollow*. He also executed the equestrian statue of Gen. John F. Reynolds, which stands before the City Hall in Philadelphia.

ROGERS, RANDOLPH, an American sculptor; born in Waterloo, near Auburn, New York, July 6, 1825. From 1848 to 1850 he studied sculpture at Rome; then for five years he had a studio in New York, and in 1855 he returned to Italy. He resided many years in Rome. His works include the ideal busts *Ruth*; *Isaac*; *Nydia*; *Boy Skating*; and *The Angel of Resurrection*, which is on the monument to Colonel Samuel Colt in Hartford, Connecticut; *Lost Pleiad*; *Genius of Connecticut*, on the state capitol at Hartford; memorial monuments for Cincinnati, Providence, Detroit, and Dorchester, Massachusetts; an equestrian *Group of Indians*; and the portrait-statues *John Adams*, placed in Mount Auburn ceme-



H. W. ROGERS.



JOHN ROGERS.

tery; *Abraham Lincoln*, unveiled at Philadelphia in 1871; and *William H. Seward*, at Broadway and Twenty-third streets, New York City. He also made the bas-reliefs on the bronze doors of the capitol at Washington, which represent scenes from the life of Columbus. He died in Rome, Jan. 15, 1892.

ROGERS, WILLIAM BARTON, an American geologist, brother of Henry Darwin Rogers (q.v., in these Supplements); born in Philadelphia, Pennsylvania, Dec. 7, 1804. He was educated at William and Mary College, and became professor there in 1828. He was made professor in the University of Virginia in 1835, and held this post till 1853, when he removed to Boston. During this period he made a geological survey of Virginia. In 1864 he organized the Massachusetts Institute of Technology, of which he became president. In 1876 the American Association for the Advancement of Science chose him as its president. He was the author of *Elements of Mechanical Philosophy*; *Strength of Materials*; and of many scientific papers, several of which were written in collaboration with his brother. He died in Boston, May 30, 1882.

ROGERSVILLE, a village and the capital of Hawkins County, northeastern Tennessee, 58 miles N.E. of Knoxville, on the Southern railroad, in an agricultural region, and contains McMinn Academy, Synodical Female College (Presbyterian), and has also several quarries of variegated marble, a furniture factory and a roller flour-mill. Population 1890, 1,153.

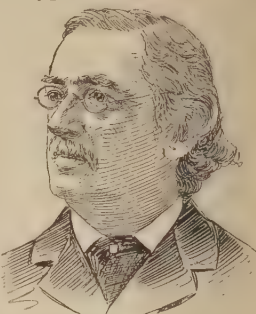
ROGUE RIVER. See OREGON, Vol. XVII, p. 823.

ROHLFS, ANNA KATHARINE GREEN, an American authoress; born in Brooklyn, New York, Nov. 11, 1846. She graduated at the Ripley Female College, Poultney, Vermont, in 1867; in 1884 married Charles Rohlf, and afterward moved to Buffalo, New York. Her first novel, a detective story, entitled *The Leavenworth Case*, appeared in 1878, and had a very large sale. After that she published others of the same sort, among which are *The Sword of Damocles* (1881); *Hand and Ring* (1883); a drama, *Risifi's Daughter* (1887); and a volume of verse.

ROHLFS, FRIEDRICH GERHARD, a German explorer; born in Vegesack, near Bremen, April 14, 1831. After studying medicine he went to Algeria in 1855 as a surgeon of the French army. In 1860 he went to Morocco, which country he explored in several directions. In 1867 he joined the English expedition against Abyssinia; and in 1873 he made an expedition into the Libyan Desert with the support of the Khedive of Egypt. He published his experience in the countries visited in his *Reise durch Marokko* (1869); *In Abessinien* (1869); *Von Tripolis nach Alexandria* (1871); *Aufenthalt in Marokko* (1874); *Quer durch Afrika* (1875); *Entdeckung und Erforschung Afrika's* (1876-81); and *Meine Mission nach Abessinien* (1883). In 1885 he was made German consul-general at Zanzibar, but did not long retain this post. When not engaged in foreign travels he made his residence at Weimar.

ROLF. See ROLLO, Vol. XX, pp. 627, 628.

ROLFE, WILLIAM JAMES, an American editor and author; born in Newburyport, Massachusetts, Dec. 10, 1827; educated at Amherst College (1854-58), but did not graduate; was an instructor in Maryland; master in the High School, Cambridge, Massachusetts (1862); and editor of *Popular Science News* (1869). With J. H. Hanson he produced a *Hand-book of Latin Poetry* (1865); and *Selections from Ovid and Virgil* (1866); with J. A. Gillet he prepared the Cambridge



WILLIAM J. ROLFE.

Course of Physics, six volumes, embracing *Chemistry*, *Natural Philosophy*, and *Astronomy* (1867-69); edited *The English of Shakespeare*, etc., by G. L. Craik, LL.D. (1867); the plays, sonnets and poems of Shakespeare, in 40 volumes, the edition being known as *The Friendly Edition* (1870-84), which secured great popularity, and was valuable on account of the editor's annotations; edited, with notes, separate volumes, the selected works of Milton, Gray, Goldsmith, Scott, Byron, Wordsworth, Macaulay, Tennyson and Browning; *Tales from English History*, in prose and verse, with notes (1888); *Tales from Shakespeare's Tragedies*, by Charles and Mary Lamb (1891); *Tales from Scottish History* (1891); and *Merrill's English History*, by George Curry (1892). In 1849 Amherst enrolled his name in its list of regular graduates; in 1859 he received the degree of A.M. from Harvard; the same degree from Amherst in 1865, and Lit.D. from the latter in 1887. He made many visits to Europe, and on Aug. 29, 1892, met Tennyson at Aldworth, publishing an account of the visit in *The Critic*, November 26th of that year. He edited the *Shakespeareana*, in the latter journal.

ROLL, ALFRED PHILIPPE, a French painter; born in Paris, March 10, 1847. He studied under Gérôme and Bonnat; obtained medals in the Salons of 1875 and 1877; was made officer of the Legion of Honor in 1889. Roll's style of painting is vigorous and realistic. Among his best-known canvases are *The Inundation in the Suburbs of Toulouse*; *In Normandy*, which is in the Luxembourg; *The Festival of Silenus*, in the museum at Ghent; and *The Strike of the Miners*, in the museum at Valenciennes.

ROLLA, a city and the capital of Phelps County, central Missouri, 50 miles S.S.E. of Jefferson City, on the St. Louis and San Francisco railroad. It is in an iron-mining district, and here is located the Missouri School of Mines and Metallurgy, a branch of the State University. Population 1890, 1,588.

ROLLING-MILLS. On the general subject of rolling-mills, see IRON, Vol. XIII, pp. 328-331; and IRON AND STEEL, in these Supplements.

ROMAIC OR MODERN GREEK. See GREECE, Vol. XI, pp. 116, 117, 119, 148.

ROMAN ARCHÆOLOGY. See ROME, Vol. XX, pp. 807-837.

*ROMAN CATHOLIC CHURCH, commonly

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known as the Catholic Church, the body of Christians throughout the world who profess the same doctrine, partake of the same sacraments, and recognize the spiritual supremacy of the Pope, the Bishop of Rome. The subject may be treated most conveniently by considering, under separate heads, the doctrine, government, history, and statistics of this powerful and widespread religious organization.

1. Catholics believe that there is one God, in three divine persons,—Father, Son and Holy Ghost; that God, by his word only, and out of nothing, created heaven and earth and all things; that angels and men are the chief creatures of God; that some of the angels sinned and were punished; that Adam and Eve, the first man and woman, disobeyed the command of God, and were punished by the loss of justice and innocence, and by sickness and death; that this deprivation of justice is original sin, and all men are born with this defect or sin; that through the merits of her divine Son, and because she was to be his mother, the Blessed Virgin Mary was preserved free from this original sin, which privilege is called her Immaculate Conception. Catholics believe that God the Son, the second person of the Blessed Trinity, by the power of the Holy Ghost, assumed human nature of the Blessed Virgin Mary, and is called the God-man, Jesus Christ; that for this reason the Blessed Virgin Mary, although a creature, is called the mother of God, and is deserving of a very special, but not divine, honor,—divine honor being paid to God alone. They believe that Jesus Christ, by his suffering and death, redeemed men, and obtained for them grace, or supernatural help, whereby they may be saved; that the chief channels of grace are the seven sacraments, all of which were instituted by Christ; viz., Baptism, in which original sin, and actual sins committed before baptism is received, are forgiven; Confirmation, which makes those baptized strong and perfect Christians; Holy Eucharist, which is the sacrament of the body and blood, soul and divinity, of Jesus Christ, really present under the appearances of bread and wine; Penance, in which sins are forgiven which are committed after baptism; Extreme Unction, which is for the help and comfort of those in danger of death by sickness; Holy Orders, by which bishops, priests, and other ministers of the church are ordained and receive the power and grace to perform their sacred duties; Matrimony, which unites a Christian man and woman in lawful marriage, and gives them grace to live happily together.

Members of the Roman Catholic Church likewise believe that Jesus Christ, the true Son of God, instituted a church or society, and that to certain ones, i.e., the priesthood in this church, he intrusted the administration of the sacraments and the teaching of his doctrine divinely revealed; that the divinely appointed visible head of the church, the Pope of Rome (the invisible head is Jesus Christ) is, by the aid of the Holy Ghost, and must be, infallible; i.e., he cannot err, when officially teaching the whole church a doctrine regarding faith or morals. This, in their belief, does not imply that the Pope cannot sin, or make a mistake in other matters, as some non-Catholics have been led to suppose. Catholics also

believe the will of God, is that all are bound to belong to the church, and he who knows the church to be the true church, and willfully remains out of it, cannot be saved. Such a person willfully disobeys God, and refuses the divine assistance necessary for salvation. Reasons of convenience, of prejudice, or of human respect, they say, God will not accept, nor will a sincere and intelligent man offer. While believing this in regard to the church, they are nevertheless not to be the judges of their fellow-men in regard to salvation, which finally depends on their interior dispositions, known only by God and by themselves.

Catholics also believe that as Jesus Christ is God, he can do all things, and particularly that he can forgive sins, and that he can change the substance of bread and wine into the substance of his body and blood. They believe, moreover, that, if he wishes, he can appoint men to do the same things in his name and by his power. They believe that, as a matter of fact, he has given this power to certain men, viz., to the priesthood of the church, and they prove this from Scripture and tradition to their satisfaction. They believe a man must be truly sorry for his sins, otherwise they will not be remitted, even though absolution be given; and they repudiate as an insult the charge that money, or any consideration, is received by priests for the forgiveness of sins. According to Catholic doctrine, an indulgence is a remission, in whole or in part, of the temporal punishment due to sin. It is not a pardon of sin, nor a license to commit sin, and one who is in mortal sin cannot gain an indulgence. Further, according to Catholic doctrine, the marriage of Christians is a sacrament, and cannot be dissolved by any court, but only by the death of either the husband or wife. The church forbids the marriage of Catholics with persons who have a different religion, or no religion at all, because such marriages generally prove unhappy, and lead to contentions or indifference, to loss of faith, and to the neglect of the religious education of the children. The removal of this prohibition is called a dispensation. Catholics maintain that all men are bound to believe the revelation of God and keep his commandments. They believe in heaven,—a state in which the good are rewarded eternally; they believe in hell,—a state to which the wicked are condemned eternally; they believe in purgatory,—a state in which those suffer for a time who die guilty of venial sins, or without having satisfied the temporal punishment due to their sins; they believe in a general resurrection of the dead, followed by a general judgment, after which purgatory will cease, and the souls of the just, reunited to their bodies, will be rewarded forever, and the souls of the wicked, also reunited to their bodies, will be punished forever. They, therefore, believe the salvation of the soul is the most important affair of life.

Catholics maintain that all of the doctrines of the church, of which the above is a synopsis, are contained in the revelation of God; that this revelation is found in the unwritten and the written Word of God, or in tradition and Scripture; that tradition finds its infallible expression in the teaching

church; that both are of equal value, in as far as they transmit the divine revelation, Scripture, because it contains and is the Word of God, inspired by the Holy Ghost to the sacred authors; tradition, because it is preserved from error by the assistance of the Holy Ghost. While, therefore, members of the Catholic Church revere and use the Bible, still they believe that the Scriptures alone do not contain all the revelation of God. They maintain, moreover, that the proximate rule of faith, given by God, and accessible to every one, is the teaching of the church, or the whole Word of God, both written and unwritten, and this as taught and explained by the church, through the organ of the successors of the apostles; that such is the establishment of Christ, and the practice since the first ages.

As a teaching body, in consequence of her articles of faith, the church is opposed to secret societies in which religion is travestied and belief in its supernatural quality destroyed or endangered, or in which conspiracies against civil and ecclesiastical authority are conceived or assisted, directly or indirectly. She forbids her members joining them. The church believes in the religious education of children, and hence, in the United States, because circumstances are such that religion is not taught in public schools, she has private and parochial schools, where both secular and religious instruction are given. She does not oppose the public schools, but, on the contrary, willingly acknowledges their opportuneness for the instruction of children whose parents are not of the Catholic faith. That temperance in all things is a cardinal virtue, is part of Catholic doctrine; hence, as a teaching body, the church can adopt neither extreme. She decries the great evils of intemperance and the saloon element on the one hand, but on the other she admits a licit use of both food and drink.

2. The government of the Roman Catholic Church is vested in its clergy, as distinguished from the laity. There is a growing tendency, however, especially in the United States, to give the laity a consultative voice, particularly in financial and school matters. The visible head of the church is the Pope. By virtue of his primacy he has full and supreme power of jurisdiction over the whole church, not only as the infallible teacher in questions of faith and morals, but also as the ruler in what pertains to the discipline and government of the church throughout the world. Hence he can examine and decide all ecclesiastical causes and receive appeals from all ecclesiastical tribunals. To him exclusively belongs the right of treating major causes, such as questions of faith, the erection of episcopal sees, the canonization of saints, the trial of bishops. Those who assist the Pope as ruler of the universal church make up what is called the Roman Court. This is composed of the Sacred College of Cardinals (see CARDINAL, in these Supplements), of several congregations of these same cardinals, of some other tribunals, and of those legates, vicars, administrators, who are called Apostolic,—that is, sent by the Apostolic See and fortified with its authority and jurisdiction.

The College of Cardinals is chosen by the Pope.

All that is necessary is for the Pope to announce the name of a new cardinal. Failure to receive the insignia will not preclude a cardinal from participating in the conclave, which is a gathering of the cardinals for the election of a new Pope. Cardinals are now chosen from various countries, so that the ecclesiastical interests of all countries may be recognized, and the Pope have counselors throughout the world. According to present discipline there may be seventy cardinals, though really the number is optional with the sovereign pontiff. Six of these are cardinal bishops, fifty cardinal priests, and fourteen cardinal deacons. The cardinal bishops are the bishops of Ostia, Porto, Frascati, Sabina, Palestrina, and Albano, all in the vicinity of Rome. The cardinal priests are bishops or priests of dioceses throughout the world, who also have a church in Rome called their *title*. Cardinal deacons have each a deaconry in Rome, sometimes also called a title. The peculiar office of the College of Cardinals is to assist the Roman pontiff in ruling the universal church, and in case of vacancy in the Apostolic See, to assume the guidance of the church in necessary affairs until the election of a new Pope. These duties are performed by the cardinals as a body, not as individuals. The dignity of the cardinalate is, after that of the Pope, the highest in the church. It is greater than that of bishops, archbishops, primates or even patriarchs. Whether this precedence was obtained by cardinals only in the eleventh or twelfth century, or whether by right and in fact they always held it, is a controverted question. The Pope usually advises with the cardinals on important matters, though he is not bound to do so.

The method of selecting his successors is determined by the Pope. Whether he can choose his own successor is a controverted and delicate question. As a matter of fact, some popes have pointed out those whom they deemed best fitted to succeed them, but church history has no record of any supreme pontiff choosing his own successor, except Boniface II, in 529. The next year, however, he recalled his decree and declared it annulled. The selecting of the Pope has been different in different ages. In the first ages the election pertained to the priests and deacons of Rome. Later, the Roman people also bore testimony to the candidate's character. From the fifth to the eleventh century, emperors and kings usurped authority in the matter. In 1059 Pope Nicholas II made the cardinal bishops the sole electors of the pope, and in 1178 Pope Alexander III decreed that the election should pertain to all the cardinals, but to them alone. The secret conclave was introduced in 1274, and in 1740 the present method was perfected. A two-thirds vote is required to elect. The governments of France, Austria and Spain claimed the privilege of each excluding one objectionable candidate, but Pius IX, in three bulls published in 1871, 1872 and 1873, abolished this claim after the loss of the Papal States. Pope Leo XIII likewise has denied this privilege, though, as a matter of fact, the cardinals themselves, from motives of prudence, may respect these exclusions in future conclaves. Any man of any nationality, even a layman, may validly be

elected Pope, and as soon as he is elected and consents, he has full jurisdiction as the supreme pastor of the church. For some centuries, however, none but cardinals have been elected to the papacy. If the elected Pope is not yet a bishop, he is consecrated, by the dean of the Sacred College, the cardinal bishop of Ostia. During a vacancy, the dean of the Sacred College, the senior cardinal priest, and the senior cardinal-deacon, together with the camerlengo, assume the administration of the affairs of the Apostolic See for the College of Cardinals. A vacancy occurs through the death or resignation of the Pope, and until a new Pope is elected the pontifical jurisdiction is in abeyance, for the College of Cardinals, especially since the decree of Pope Gregory X in 1274 to that effect, can neither validly nor licitly exercise it, even by interpreted delegation.

In the first ages, the Pope advised with the Roman clergy, and later with the bishops of Italy, concerning the more important affairs of the church throughout the world. In time, the cardinals became his special counselors, and met with him nearly every day in consistory (see **CONSISTORY**, in these Supplements). But because of the mass of business which required extended examination, many cases were assigned to various committees and officials, and a number of permanent congregations and tribunals were instituted. At the present time, only the most important business is reserved for the consistory, which is called at the option of the Pope, and now meets only about twice a year. The congregations (see **CONGREGATIONS**, **ROMAN**, in these Supplements) are composed of several cardinals, assisted by officials and consultors, and have authority to hear and decide causes, both in the first instance, and on appeal from diocesan courts in the various countries of the world. When the Pope approves their finding, the decision is final, though sometimes a rehearing may be granted. Church matters referred to the Pope from dioceses in the United States, England, Ireland, Scotland, Canada, Australia, Holland, and missionary countries are sent to the Congregation of the Propaganda (see **PROPAGANDA**, in these Supplements). All business in the Propaganda is done gratuitously, even documents being furnished without charge. Most of the other congregations and tribunals collect specified fees for services. There are at least twenty congregations to which causes are referred, each having its specialty. Besides the congregations, there are three tribunals for affairs of justice, and three for hearing and granting petitions for favors. Appointments are made usually through the apostolic chancery, especially appointments of bishops. The secretary of briefs issues papers for favors of smaller moment, and the secretary of state attends to the diplomatic relations of the Holy See with countries having representatives at the Papal court. Nuncios and legates also receive instructions through this secretary, who is always a prominent cardinal. There are also various prelates attached to the Roman court, prothonotaries apostolic, domestic prelates, and chamberlains, who have rank throughout the world. Not a few such prelacies are hon-

orary dignities conferred on priests away from Rome.

3. Apostolic legates, vicars, administrators, and missionaries are sent by the Holy See to various countries, either to hear and decide church controversies, or to preach the Gospel where it is not yet known. Thus in former times, St. Patrick was sent to Ireland, St. Augustine to England, St. Boniface to Germany. For a similar purpose, monks accompanied Columbus and Cabot in their voyages of discovery, and Marquette, Jogues and others preached to the Indians living near the Great Lakes. As soon as there is a sufficient number of Catholics, bishops are appointed to rule the church in a specified territory, called a diocese. Priests are by them appointed to preach and to administer the sacraments to the Catholic people of a specified territory, called a parish. It is the spirit and the policy of the Catholic Church that both bishops and priests be natives of the countries where they administer, and to this object the church in the United States especially is tending. For a similar reason, to preclude the necessity of appealing church controversies to Rome, there to be heard before one or another of the congregations, the Apostolic Legation was established in Washington, with power to hear and finally adjudicate many, if not all, questions of discipline arising in the Catholic dioceses of the United States. The legation also tends to insure unity of action and uniformity of discipline in the various dioceses, though they are governed immediately by their respective bishop or archbishop. The legation was established Jan. 24, 1893, and Monsignor Francis Satolli, titular archbishop of Lepanto, was appointed the first delegate apostolic. An auditor to examine cases and a secretary also were appointed. Nov. 29, 1895, Monsignor Satolli was made a cardinal, and after serving for eight months more as pro-delegate, was recalled to Rome. The apostolic delegation in Washington is ecclesiastical, not diplomatic.

The first Catholic bishop in the United States was Most Rev. John Carroll of Baltimore, appointed in 1790. Under him, at that time, were 20 priests and 30,000 lay people, scattered throughout the 13 states, but particularly in Maryland, Pennsylvania and the territory northwest of the Ohio. Most of these were native-born. Bishop Carroll's calculation makes the number 44,000. In 1803, with the annexation of Louisiana, 30,000 Catholics, born there, were added to the natural increase, so that in 1810 there were 90,000 native-born and 30,000 foreign-born Catholics. In 1830 the Catholics born in the United States had gained, by natural increase, 81,500, making 231,500 out of a total Catholic population of 361,000. In 1850 the Catholic population was about 1,876,470, of whom not more than 800,000 were from abroad. In 1860 the Catholic population was 3,000,000, of whom at least 1,701,470 were natives, the natural increase by births over deaths being at least 625,000. In 1870 there were 4,685,000 Catholics, of whom 2,786,470 were born in the United States. The total foreign-born population that year was 5,567,229, of whom 1,898,530 were Catholics. In 1880, out of 7,000,000 Catholics, 4,468,470 were native-born. The foreign-born Catholics were 2,531,-

530, out of a total foreign-born population of 6,679,943, as reported by the census. In 1890 the Catholic population was certainly 10,000,000. Of these, over 6,750,000 were natives and 3,250,000 of foreign birth. These figures are substantiated, also, by a calculation made according to the English tables of mortality; for, taking the number of Catholic births from the year 1800, and calculating the survivors, there must have been, not including Indians and negroes, over 6,000,000 native-born Catholics in 1890. In 1896 there were surely 12,000,000 Catholics in the United States, of whom no fewer than 8,250,000 were native-born. From these figures it will be seen that the great body of Catholics in the United States is, and always has been, mostly native-born and English-speaking, and that those of American parentage far outnumber those born in America of foreign parentage.

The spiritual wants of these 12,000,000 Catholics in 1896 were supplied by 10,348 priests, of whom 7,756 were seculars and 2,592 members of religious orders. There were 9,500 church buildings, besides 5,093 stations and chapels. There were 243 orphan asylums and 836 other charitable institutions, supporting 33,064 children. The number of parochial schools was 3,361, and of high schools or academies, 187 for boys and 633 for girls, which, together, educated 796,348 pupils. There were, also, 28 seminaries for ecclesiastical students, besides 3 Catholic universities empowered to confer degrees by pontifical authority, with all privileges recognized by the church. The territory of the United States is divided ecclesiastically into 68 dioceses, 4 vicariates and 14 archdioceses, governed by 72 bishops and 14 archbishops. Grouped with each archdiocese are several dioceses, which, together, make 14 ecclesiastical provinces. The work of priests, ordinarily, is to preach, offer mass, and administer the sacraments, except confirmation and holy order, in parish churches, for the benefit of the people. Bishops give confirmation and holy order, and under canon-law rule the clergy of the diocese. An appeal lies from a priest to the bishop of the diocese, and from him to the archbishop of the province, or to the Apostolic Legation in Washington. An appeal may be taken from an archbishop's court to the court in Rome, but no regular appeal can be taken from the legation. Against its decision only a recourse may be made to Rome, but it is rarely effectual.

Precedence is carefully observed in the church, to avoid confusion. Not having national customs in the United States, the general rules of canon law, together with the special regulations of the Baltimore plenary councils and the practice of the Roman court, determine the precedence of some of the clergy over others. (See TITLES, ROMAN CATHOLIC, and FORMS OF ADDRESS, in these Supplements.) After the Pope, cardinals rank first, according to their order and the time of their creation. Archbishops rank next, in the United States, according to promotion to an archbishopric. Then bishops, according to the date of their consecration. Both bishops and archbishops, according to the practice of the Roman court, are entitled "The Most Reverend," the only distinction being the addition of the word "Arch-

bishop" or "Bishop." In a diocese, after the archbishop or bishop, the first in rank is his vicar-general, who represents him in certain acts. Then rank the diocesan consultors, who act as counselors of the bishop, and in case of vacancy in the diocese, together with the irremovable rectors, select three candidates for a new bishop, who is appointed by the Pope. The irremovable rectors rank next, followed by rural deans, if any, and the other clergy. The vicar-general is addressed "Very Reverend," all the others "Reverend." Roman prelates living in a diocese rank next to the vicar-general, protonotaries first, then domestic prelates, then chamberlains. All these may be addressed "Monsignor."

4. The whole number of Catholics in the world has been estimated variously. Some claim there are 250,000,000; others, depending largely on statistics compiled from reports made to the Propaganda, place the number at about 235,000,000. The fact should not be overlooked, that in diocesan reports only those who are known to be Catholics are counted, many thus being unnumbered. This is especially true of such places as the United States, Canada, Australia, Asia, and Africa. Distributed in round numbers, in Europe there are 158,000,000; in South America, 33,000,000; in Mexico and Central America, 15,000,000; in the West Indies, 3,000,000; in the United States, 12,000,000; in Canada, 2,200,000; in Asia, 8,312,000; in Africa, 2,656,000; in Australia and adjacent islands, 700,000,—making a total of 234,868,000 Catholics throughout the world. It seems unnecessary to state that all Catholics owe full civil allegiance to the governments of the countries wherein they dwell. It may be interesting, however, to note that there are, under the flags of republics, more Catholics than all other people of any and no religious belief. In the republics of Europe and Africa there is a total population of about 43,550,000, of whom all but 4,456,000 are Catholics. The total population of all the republics of North and South America, estimating the United States at 63,000,000, is about 113,000,000, of whom at least 61,500,000 are Catholics, 51,500,000 being non-Catholic, or about the proportion of 15 Catholics to 13 who are not Catholic. In the whole world there are, under republican flags, about 101,000,000 Catholics to about 55,500,000 who are not Catholic. Under the various monarchical governments of Europe there are 119,000,000 Catholics, and, including Russia, 170,000,000 who are not Roman Catholics. The unity of the Catholic Church is preserved throughout the world by all members recognizing one supreme head in spiritual matters. Though bishops are chosen in various ways, still, that they may validly be installed, their election must be confirmed directly or indirectly by the Pope. While, by consecration, the bishop receives directly from God the character and powers inherent in the episcopacy, still, to a certain extent, the exercise of these powers, and his jurisdiction over a specified territory called a diocese, depend on the pope. Thus by pontifical authority bishops may be transferred willingly from one diocese to another, or even unwillingly deposed for grave cause. The see of the Pope is Rome. The 6 cardinal-bishops have sees near Rome. The car-

dinal priests have 53 churches or titles, and the cardinal deacons 16 deaconries in the city of Rome, but several of these titles never are filled. There are eight patriarchal sees of the Latin rite and 6 of the Oriental rites. Of archiepiscopal sees of the Latin rite, 19 are subject immediately to the Holy See, and 154 have ecclesiastical provinces. Of the Oriental rites, there are 18, making 191 residential archbishops in the world. Of episcopal sees of the Latin rite, 85 are subject immediately to the Holy See, and 626 belong to ecclesiastical provinces, being suffragan to archiepiscopal sees. Of the Oriental rites, there are 54 episcopal sees. There are also 86 titular archbishops and 434 titular bishops, which the Holy See is accustomed to confer, in order that the persons thus promoted may fill important offices in the Roman court, or act as auxiliary and coadjutor bishops to the incumbents of residential sees throughout the world. Besides these, the Propaganda has 2 titular archbishops and 27 titular bishops which it may confer with the consent of the Pope. There are 17 abbacies and prelaties belonging to no diocese. There are also 8 apostolic delegations, 125 apostolic vicariates and 39 apostolic prefectures subject to the Propaganda.

The residential sees, mentioned above, of the Latin rite are found as follows: In Austria-Hungary there are 11 archbishops and 44 bishops; in Belgium, 1 archbishop and 5 bishops; in France, 17 archbishops and 67 bishops; in Germany, 5 archbishops and 21 bishops, of which 7 are subject immediately to the Holy See; in Great Britain, there is 1 archbishop in England, with 14 bishops; 4 archbishops in Ireland, with 25 bishops; 2 archbishops in Scotland, with 4 bishops. Two bishops in Malta are subject immediately to the holy see, as is also the see of Glasgow, in Scotland. Greece has 3 archbishops and 5 bishops. Holland has 1 archbishop and 4 bishops. Italy has 49 archbishops, of which 12 are immediately subject to the Holy See, and 222 bishops, of which 65 are immediately subject. Monaco, Montenegro and Bulgaria have each 1 bishop. Portugal has 3 archbishops and 9 bishops; Roumania and Serbia have 1 bishop each. Russia, with Poland, has 2 archbishops and 13 bishops. Spain has 9 archbishops and 45 bishops; Switzerland has 5 bishops, all immediately subject; and Turkey 3 archbishops and 4 bishops. In Asia, Turkey has 2 archbishops and 1 bishop. Japan has 1 archbishop and 3 bishops. Oriental India has an apostolic delegation, 8 archbishops and 22 bishops. In Persia, there is 1 bishop and several prefectures. A number of vicariates and prefectures cover China and the rest of Asia. These latter exist where missionary priests are preaching the Gospel but no hierarchy is yet established. In Africa, there are 2 archbishops and 11 bishops, besides 26 vicariates and 20 prefectures. Australia has 5 archbishops, 14 bishops, 4 vicariates and 1 prefecture. New Zealand, the Philippine and other islands have 2 archbishops and 7 bishops, with 10 vicariates and 2 prefectures.

In America, Canada has 7 archbishops and 21 bishops, with 3 vicariates and 3 prefectures. The United States have 14 archbishops and 68 bishops, with 4 vicariates and 1 prefecture. Mexico has 6 archbishops and 21 bishops. Central and South America have 14 archbishops and 66 bishops, each country making an ecclesiastical province. From these statistics it will be seen that the Roman Catholic Church is spread into all countries of the globe. The Latin language is used in the liturgy of all these churches, thus giving them a common medium of communication, both in church services and in councils. While unity with the Holy See is considered necessary, still, uniformity is not always required either in liturgy or discipline.

The Oriental churches in communion with the Holy See, holding the same faith and the same principle of authority as the Latin Church, have their own special rites, discipline and liturgical language. The various rites are the Armenian, Coptic, Ethiopic and Abyssinian; Greek, with Græco-Roumanian, Græco-Ruthenian, Græco-Bulgarian, Græco-Melchite subdivisions; Syrian, with Syro-Chaldean, Syro-Maronite, Syro-Malabaric subdivisions. In the Western or Latin Church, the liturgy, or the word-form of the mass, is that used by the Roman Church. To-day the only exceptions are the Ambrosian liturgy, peculiar to the Cathedral of Milan, and the Mozarabic, confined to the city of Toledo, in Spain. In the East, to-day, the chief liturgies, or word-forms of the mass, in general use are those prepared by St. John Chrysostom and by St. Basil the Great. These liturgies are used by both Catholics and schismatics. Both these forms for saying mass were originally written in Greek. Other Eastern liturgies are those ascribed to St. James the Apostle, afterward modified by St. Cyril of Jerusalem, and to St. Mark, formerly used throughout the patriarchate of Alexandria; but the latter is scarcely used at the present day, and the former only among the Syrians and Copts, with considerable changes. There are, then, in general use, in the Catholic Church, four principal liturgies, or word-forms of the mass. However, mass is said in nine different languages, viz., in Latin, Greek, Syriac, Chaldaic, Slavonic, Wallachian, Armenian, Coptic, and Ethiopic. These languages, as they appear in the liturgy, are quite different from the same languages as spoken to-day.

The Armenians in communion with the Holy See are allowed to use the Armenian language in their liturgy, and also to have special rites. Unlike all other Christians of the East save the Maronites, they use unleavened bread in the Holy Eucharist, as do the Latins. The heretical Armenians are *Monophysites*,—i.e., believers in but one nature, the divine, in Jesus Christ. The Catholic Armenians are found in Armenia, Asia Minor, Syria, Palestine, Turkey, Georgia, Greece, Egypt, Italy, Austria, and Russia. They number about one hundred and fifty thousand, and are governed by a patriarch styled "Patriarch of Cilicia of the Armenians." He resides at Constantinople. Besides the patriarch, there are two archbishops and 16 bishops. They have a college in Rome and a seminary at Begourmar, in Mount Lebanon. On the island of San Lagaro, at Venice,

they have a monastery which is famous all over the world for its printing-presses. Here most of the Armenian ecclesiastical books are printed.

The *Copts* in communion with the Holy See formerly were governed by a vicar apostolic residing at Cairo, but in November, 1895, Pope Leo XIII constituted for them a regular hierarchy, with a patriarch styled "Patriarch of Alexandria of the Copts." Besides the patriarch, they have two bishops. They number about thirty thousand. The heretical Copts, of whom there are one hundred and fifty thousand, are Monophysites. The Copts use three different liturgies in the celebration of mass, those of St. Basil, St. Gregory and St. Cyril. They have as many as twelve liturgies, but these three are the chief ones now used. The Coptic, or ancient Egyptian language, is used in celebrating their church services, but the rubrics are given in Arabic.

The *Ethiopic* or *Abyssinian* rite differs little from that of the Copts, either in discipline or church customs. The Catholic Abyssinians now number about twenty-five thousand. They are governed by a Latin vicar apostolic. The schismatic or heretical Abyssinians, of whom there are three million, are Monophysites. The church language is old Ethiopic, which is quite similar to the Hebrew.

In *Greek*, mass is said to-day by the Uniate or *Melchite* Catholics. They are to be found in Syria, Jerusalem, Russia, Greece, Italy, and in several other places in Europe. There are some, also, in America. They are called Melchite, from *Malko*, the Syriac for king, because they retained the faith and supported the Emperor Marcian against the Monophysite heretics at the time of the Council of Calcedon (A.D. 451). These Catholics are allowed by the Holy See to retain all their ancient rites, such as consecrating the Holy Eucharist in leavened bread, giving communion in both kinds, saying the creed without the "Filioque," and putting warm water into the chalice after consecration. The lower orders of the clergy are allowed to marry, and when promoted to subdeaconship, deaconship, and priesthood, they may retain their wives. But after receiving the higher orders they cannot marry. Bishops must all be single men. The Greek Catholics have three different liturgies for celebrating mass. The first, that of St. John Chrysostom, which is used ordinarily; the second, that of St. Basil, which is used on all Sundays in Lent except Palm Sunday, on Holy Thursday, Holy Saturday, the vigils of Christmas and Epiphany, and the feast of St. Basil, January 1st. The third liturgy is called the "Presanctified," and is used during Lent, except on Sundays. The Græco-Melchite Catholics, of whom there are about one million one hundred thousand, are governed by a patriarch, who is styled "Patriarch of Antioch of the Greek Melchites," but who lives in Damascus. They have, also, three archbishops and nine bishops.

In the *Slavonic* language the Græco-Bulgarians and the Græco-Ruthenians in communion with Rome celebrate mass according to the Greek liturgies. The same liturgy and language are used, also, by the schismatic church of Russia. The *Græco-Bulgarian* Catholics, in number about thirty-three thou-

sand, have one archbishop administrator apostolic for the Bulgarians of Constantinople, and two bishops, one for Thrace, the other for Macedonia. A large number of Bulgarians follow the Roman instead of the Greek rite.

The *Græco-Ruthenian* Catholics are found chiefly in Galicia, Poland and Hungary. They have one archbishop and eight bishops, governing about four million adherents. Many Ruthenians use the Roman liturgy in the Slavonic tongue. The right to use the Slavonic language in celebrating mass was accorded in the ninth century by Pope Adrian II, when St. Methodius and St. Cyril converted the Slavs to the faith. Since the seventeenth century, when a great number of them came into the church, the *Wallachians*, with the tacit consent of the Holy See, have been saying mass in their native tongue, which, however, is the old classic language no longer in daily use. The liturgy is the Greek.

The *Græco-Roumanian* Catholics, which term includes the Wallachians, in a great national synod held in 1700 at Fogaras, "freely and spontaneously, by the impulse of God," concluded a union with the Roman Catholic Church. On that day about a million people were united to Rome. In 1854, Pope Pius IX, erected into an ecclesiastical province the United Roumanian Church, with an archbishop and three bishops. The United Catholics are chiefly in Transylvania and Hungary, and number about one million five hundred thousand. They have two native seminaries, besides several places in the Greek College in Rome given them by Pius IX.

The *Syriac* rite, like the Greek, has several subdivisions. These are Pure-Syrian, Syro-Chaldean Syro-Maronite, and Syro-Malabaric. Syrian is the liturgical language of those places where the liturgy of St. James is used in celebrating mass. It is claimed to be the same language as that used by Christ and his apostles. The *Pure-Syrians* have a patriarch who resides in Mardin, but is styled "Patriarch of Antioch of the Syrians." They have, also, three archbishops and six bishops. About fifty-two thousand Catholics use this rite. They are the remnants of the primitive Syrian Church, which never separated from the Holy See.

The *Syro-Chaldaic* is a language peculiar to Babylonian Catholics, who are chiefly converts from Nestorianism, and dwell in Mesopotamia, Armenia and Kurdistan. They have a patriarch entitled "Patriarch of Babylonia of the Chaldees," but who resides at Mosul and Bagdad. They have, also, two archbishops and ten bishops. About fifty thousand Catholics belong to the Syro-Chaldaic rite. All the liturgical books of these people are written in the Chaldaic, in that peculiar character known as the "Estrangelo"; for the Chaldaic, it may be remarked, has 18 different alphabets.

The *Syro-Maronites* use unleavened bread for consecrating the Holy Eucharist; and, like the rest of the Orientals, communicate the laity under both kinds, except that in communicating the sick only the species of bread is used. They use incense at low mass as well as at high mass, and read the Gospel in Arabic after it has been read in Syriac, Arabic being the vulgar language in those countries where

this rite prevails. Their secular clergy number about one thousand, and their regular clergy, or monks, about fourteen hundred. The monks are not married. The greater number of Maronites are in Lebanon, where their patriarch resides, though he is styled "Patriarch of Antioch of the Maronites." Maronites are found, also, in Syria, Egypt, Tripoli and Cyprus. Besides the patriarch, they have six archbishops and three bishops. About five hundred thousand Catholics follow the Maronite rite. One peculiarity of their government is that the people elect the patriarch, who, however, must await the confirmation of the Pope before he is installed in office.

The *Syro-Malabaric* rite had until lately no regular hierarchy, though the Catholics number about three hundred thousand. They depended on two Latin vicars apostolic, one living in Trichoor, the other in Cot-tayan. Their priests, however, used their own liturgy, not the Latin one. In 1896, Pope Leo XIII gave them a hierarchy. Catholics of this rite are found chiefly in Malabar, on the west coast of India.

The various Oriental rites exist side by side, and not infrequently cover the same territory. In several instances bishops of different rites reside in the same city, both being in communion with Rome. The same may be said of the Latin and the Oriental rites, both mutually giving respect and avoiding interference. There is a movement at present for a reunion of other churches with that of Rome; and the better to examine matters connected therewith, and promote this desirable object, a special "Congregation or Commission for the Reunion of Dissident Churches" was established in Rome in 1895, by Pope Leo XIII.

J. CARDINAL GIBBONS.

ROMAN DE LA ROSE. See FRANCE, Vol. IX, pp. 644, 645.

ROMANES, GEORGE JOHN, a British biologist, was born in Kingston, Ontario, Canada, May 20, 1848. He was educated at Cambridge, England, the bent of his studies drawing him to natural science, and, later on, to the exposition of evolution in the field of psychology. Early in his career he gained reputation as an investigator and writer in biology, and became intimate with Charles Darwin. For a time he was professor of physiology at the Royal Institution and lecturer on natural history at the University of Edinburgh. In 1890 he removed to Oxford, where he founded the Romanes Lectures. In 1879 he was elected a fellow of the Royal Society, and was also a member of the Linnæan Society. In 1881 he published *Scientific Evidences for Evolution*, an epitome of the testimony for evolution, which he succinctly presented in four series of arguments—from classification, or the affinities of animals and plants; from their geological succession; from their geographical distribution; and from embryology. He contributed the article on HYBRIDISM (see Vol. XII, pp. 422-426) and INSTINCT (see Vol. XIII, pp. 157-160), to this ENCYCLOPÆDIA. His chief writings embrace *A Candid Examination of Theism* (1878); *Animal Intelligence* (1881); *Organic Evolution*

(1882); *Mental Evolution in Animals* (1883); *Jelly-Fish, Star-Fish, and Sea-Urchins* (1884); *Mental Evolution in Man* (1888); *Origin of the Human Faculty and Philosophy of Natural History before and after Darwin* (1892). *An Examination of Weismannism*, comprising theories of heredity and evolution, appeared posthumously in 1896. Another posthumous volume, a collection of *Essays*, appeared in 1896, together with *Selections from His Poems*. Mr. Romanes for a time discarded the theory of intelligent design in his writings, as supernatural, and against that logic which forbids us to assume the operation of higher causes when lower ones are sufficient to produce the effect. Shortly before his death he publicly renounced his position as an opponent of teleology and the supernatural, as his *Thoughts on Religion* (1895), edited by Canon Gore, and the *Life and Letters of Romanes*, edited by his wife (1896), disclose. He died at Oxford, May 23, 1894.

ROMANESQUE. See *Pointed Architecture*, under ARCHITECTURE, Vol. II, p. 422.

ROMANO, GIULIO. See PIPPI, Vol. XIX, p. 112.

ROMANOFF. See RUSSIA, Vol. XXI, pp. 95-102.

ROMANSCH. Same as LADINO. See ROMANCE LANGUAGES, Vol. XX, p. 668.

ROMANTICISM. See FRANCE, Vol. IX, p. 678; GERMANY, Vol. X, pp. 541-543; and ROSSETTI, Vol. XX, pp. 859-860.

ROMANY LANGUAGE. See GIPSIES, Vol. X, pp. 613-615.

ROME, a city and the capital of Floyd County, northwestern Georgia, 60 miles S. of Chattanooga, Tennessee, on the Coosa River, and on the Southern, the Nashville, Chattanooga and St. Louis and the Chattanooga, Rome and Columbus railroads. It is situated picturesquely in a rich agricultural region. The city has a large trade in grain, cotton, grass and lumber, and is at the head of navigation. It is the seat of two colleges for women, has a fine water-power, manufactures lumber, iron and machinery, and has cotton-compressing works. It also has an infirmary, banks, public parks and an electric-lighting plant. Population 1890, 6,950.

ROME, a city of central New York. It is on the Rome, Watertown and Ogdensburg, the New York, Ontario and Western and the New York Central and Hudson River railroads, and on the Mohawk and Black rivers. The city is laid out with considerable regard to beauty of location, and is in all respects attractive. The streets are well lighted by electricity, are regular, and the principal ones are one hundred feet wide. It also has a good water-supply, taken from the river. It has good public schools, St. Peter's Academy (Roman Catholic), two libraries and several banks, one a savings bank with deposits of over \$2,000,000. The manufacturing industries embrace locomotive-works, iron-works, factories for the production of furniture, machinery, hardware, specialties and trimmings, cigars, cement, glue, saddlery, harness, wire, etc.; has, also, saw and grist mills, gas-works, creameries and

dairies and canning-works. Population 1880, 12,-194; 1895, 14,991. See also *ROME*, Vol. XX, p. 838.

ROMEO, a village of Macomb County, southeastern Michigan, 30 miles N. of Detroit, on the Grand Trunk railroad. It is in an excellent farming region, and has manufactories of door-hangers, carriages and road-carts, iron castings, farm tools, steam-engines, flour and lumber. Population 1890, 1,684; 1894, 1,621.

ROMESCOT. See *PETER'S PENCE*, in these Supplements.

ROMILLY, JOHN, BARON. See *ROMILLY, SIR SAMUEL*, Vol. XX, p. 839.

RONCADOR REEF, a partially hidden bank in the Caribbean Sea, in lat. $13^{\circ} 34' N$, and long. $80^{\circ} 5' W$. It was on this reef that the United States warship *Kearsarge* was wrecked, Feb. 10, 1894. See also *KEARSARGE*, and *WINSLOW, JOHN ANCRUM*, in these Supplements.

RONCESVALLES. See *ROLAND, LEGEND OF*. Vol. XX, p. 626

RONGE, JOHANN, a leader of a German Catholic movement (1813-87). See *GERMAN CATHOLICS*, Vol. X, pp. 444, 445.

RÖNTGEN, WILLIAM CONRAD, a German physicist; born in Holland in 1845; studied at the University of Zurich until his twenty-fifth year, graduating M.D. He was a favorite pupil of Professor Kundt, and when the latter removed to Würzburg, the pupil followed, and again in 1873 accompanied the Professor to Strasburg, as assistant professor. In 1875, Röntgen became professor of mathematics and physics at the Agricultural Academy of



PROFESSOR RÖNTGEN.

Hohenheim, a village near Stuttgart, Würtemberg. In 1876 he returned to Strasburg University, and in 1879 became professor in and director of the University and Institute of Physics in Giessen, a city made famous by Baron Liebig. In 1888 he returned to Würzburg, in Bavaria, where he occupied the chair of physics. He began to publish scientific papers in 1873, at Zurich, where he issued a monograph on the way to establish the relations as to the warmth that exists in the atmosphere. Among his other papers are those referring to his various studies, including a method to fix the isothermal surfaces of crystals; the use of the ice-calorimeter to determine the intensity of sunlight; the figures produced in dust by electrical discharges; the transmission of the electric discharge through gases; diathermance; and flame-sounds. It was in December, 1895, that he announced, at the meeting of the Würzburg Physico-Medical Society, and on Jan. 4, 1896, that he described, at the celebration of the semi-centennial of the founding of the Berlin Physical Society, his discovery, which had been made Nov. 8, 1895, of "a new kind of rays." As this discov-

ery is treated of in the article *ELECTRICITY*, in these Supplements, it need only be said that the new method of "photographing the unseen" appealed to the popular fancy as nothing else had done for years. The results of the discovery can hardly be estimated. One of the first inventions embodying its principle is the cryptoscope (q.v., in these Supplements). The German Emperor called the discoverer to demonstrate the rays in the imperial presence, and allowed a "shadowgraph" of the bones of his arm to be taken. The Emperor decorated the professor with the Order of the Royal Crown, and Prince Ludwig of Bavaria created him a baron.

RÖNTGEN RAYS OR ROENTGEN RAYS AND PHOTOGRAPHY. See *ELECTRICITY*, § 96, and *PHOTOGRAPHY*, in these Supplements.

ROOD, OGDEN NICHOLAS, an American physicist; born in Danbury, Connecticut, Feb. 3, 1831. He graduated at Princeton, and studied at Sheffield Scientific School and the universities of Munich and Berlin. In 1858 he was chosen professor of chemistry and physics at Troy University; after 1863 was professor of physics at Columbia, and a member of the Academy of Sciences. He was one of the first to apply photography to the microscope; did valuable work in the study of the electric spark; in 1880 devised a mercurial air-pump having a high degree of exhaustive power, and did much work in photometry and in color-contrast. The results of his work appear in articles written for magazines, and in his *Modern Chromatics* (1881).

ROODHOUSE, a city of Green County, western Illinois, 55 miles N. of St. Louis, on the Chicago and Alton and the Chicago, Burlington and Quincy railroads. It is in a truck and grain raising region, and contains flour-mills, grain-elevators, stock-yards, railway shops, water-works, banks and papers. Population 1890, 2,360.

ROOD-SCREEN. See *ARCHITECTURE*, Vol. II, p. 472.

ROOF. See *BUILDING*, Vol. IV, pp. 484, 501-503. For groining, see *ARCHITECTURE*, Vol. II, p. 428.

ROON, ALBRECHT THEODOR EMIL, COUNT VON, a German general; born April 30, 1803. He pursued the higher military studies at Berlin from 1824 to 1827, and then became a teacher of cadets. He rose from grade to grade until he was commander of a division in 1858. In 1859 he was called to take charge of the Ministry of War, and two years afterward also of the Ministry of the Marine. The Schleswig-Holstein campaign of 1864 and the Austro-Prussian war of 1866 gave full proof of his abilities, and King William honored him with the cross of the Black Eagle and a dotation. During the war with France (1870-71) he showed again his superior talents. In 1871 he was made a count and received a new dotation. In 1873 he became field-marshal, and president of the Prussian Cabinet, and retired from public life. He died in Berlin, Feb. 23, 1879.

ROOPNA-RAYAN OR DALKISSORE, a river

of Bengal. See DALKISSORE, in these Supplements.

ROOSEVELT, ROBERT BARNWELL, an American public man; born in New York City, Aug. 7, 1829. He was admitted to the bar in 1850, but, after practicing for a number of years, retired and devoted his time to politics and literature. He was an ardent sportsman, and was fish commissioner in New York, having been the founder of the commission. In 1878 he was sent to Congress; in 1888 resigned from the fish commission to go as minister to the Netherlands; was editor of *The Citizen*, and published *The Game Fish of North America* (1860); *The Game Birds of the Coast and Lakes of the Northern States* (1866); *Five Acres Too Much*, a satire on amateur farming (1869); and *Progressive Petticoats* (1871).

ROOSEVELT, THEODORE, an American politician; born in New York City, Oct. 27, 1858; was educated at Harvard; was a member of the New York assembly, (1882-84); advocated civil service reform, and was United States Civil Service Commissioner (1889-90), resigning to become police commissioner of New York City. He was appointed to this office by the reform Mayor Strong, to improve the efficiency of



THEODORE ROOSEVELT.

the New York police, whose corruption had been disclosed by the investigations carried on by John T. Goff and the Lexow Committee. He succeeded in carrying out a number of reforms, and became widely known from his enforcement of the liquor law. He wrote *Hunting Trips of a Ranchman*, and other works descriptive of Western hunting-life; *Life of Gouverneur Morris* (1888); *The Winning of the West* (1889); *The History of New York City* (1891); and *The Wilderness Hunter* (1892). Appointed Assistant Secretary of the Navy in 1897.

ROOT, MATHEMATICAL. See ARITHMETIC, Vol. II, pp. 532, 533; ALGEBRA, Vol. I, pp. 543 et seq.; and NUMBERS, Vol. XVII, pp. 617 et seq.

ROOT, GEORGE FREDERICK, an American musician; born in Sheffield, Massachusetts, Aug. 30, 1820. He studied music in Boston, and later in New York, where he taught till 1850, when he went to Paris for a year; in 1859 became a member of the firm of Root and Cody, in Chicago; was the originator of normal musical institutes, and author of many of our most popular songs, of which his first was *Hazel Dell*, followed by *Rosalie*, *the Prairie Flower*; *Battle Cry of Freedom*; *A Hundred Years Ago*; *There's Music in the Air*; *The Old Canoe*; *Just Before the Battle*, *Mother*; *Tramp*, *Tramp*, *Tramp*; and a very large number of other songs and pieces of music. He died at Bailey's Island, Maine, Aug. 6, 1895.

ROOT, JOHN WELLBORN, an American archi-

tect; born in Lumpkin, Georgia, Jan. 10, 1850. He studied in Liverpool, England, during the Civil War, and afterward graduated at the College of the City of New York in 1869. He immediately began work as a draftsman in an architect's office, and in 1871 began business for himself, in Chicago. In 1873 he formed a partnership with D. H. Burnham, taking upon himself the department of design. This partnership continued until Mr. Root's death, Jan. 15, 1891. During this period the firm erected notable buildings in almost every large city in the Union; developed the style known as "Chicago construction" for high buildings; first used steel rails imbedded in concrete for foundations, and the first to make use of the cantilever system for upholding old walls. Among the buildings erected are the Rookery, Woman's Temple, Masonic Temple and Monadnock, in Chicago; the Board of Trade, in Kansas City; the Mills Building, in San Francisco, etc. Mr. Root, in September, 1890, was appointed consulting-architect for the Columbian Exposition, and to him was due much of the beautiful landscape and architectural effect.

ROOT-PRESSURE, the name given to the pressure under which the absorbed water of the roots exists, and due to the elastic pressure of the distended walls of the parenchyma cells. Under this pressure the water is filtered into the wood elements, through which it is conveyed to the stem and leaves. A common expression of root-pressure is seen in the "bleeding" of certain trees and shrubs when pruned.

ROOTS, LANGUAGE. See PHILOLOGY, Vol. XVIII, pp. 769, 770.

ROOTS OF PLANTS. See BOTANY, Vol. IV, pp. 94, 95; PHYSIOLOGY, Vol. XIX, p. 46.

ROOT-TUBERCLES. See ECOLOGY, in these Supplements.

ROPE-MAKING MACHINERY. The larger sizes of ropes only are now made in ropewalks, chiefly because the manufacturers possess the old mechanisms, and do not care to pay for improved machines for sizes for which the demand is not great. In the manufacture of hemp rope in the United States, the first machines used are for forming the slivers. The single-chain or drawing machine has a chain formed of linked bars studded with pins. A pair of fluted iron drawing-rolls draw the body of hemp on the chain into a sliver four or six times the original length. The double-chain or heckling machine has a second chain, moving faster than the first chain, for combing the hemp into slivers, all lying in the same direction. These machines are arranged in sets or series, and the hemp is run through from five to ten times, according to its quality or condition. A more recent machine for this work is the Montgomery breaker, resembling the breaker used in cotton-manufacture. It combs and straightens the hemp into slivers ready for spinning. This operation is performed on a special form of spinning-jenny, on which the sliver is drawn in on capstan-wheels, and formed into thread. It is

delivered as yarn, on bobbins of about fifteen pounds each. These bobbins go to the rope-machines which consist of a former and a rope-layer. In the forming-machine the threads or yarn are led through a gauge-plate, which guides them to the capstan, on which the first strand is twisted, after which a right and left screw guides the rope back and forth on a reel. These reels then go to the laying-machine, which is of the same character as the forming-machine, only much larger, and here the strands go through a similar mechanism, and are laid into rope. The variations in lay are obtained by the use of change-wheels, of varying speed, used in connection with the draw-off drums. Wire rope is made on wire-stranding and wire-closing machines, which resemble the former and layer above described. The wires in the stranding-machine are passed through apertures in rotating nozzle-plates, and then through a fixed closing-block or die, after which the strand is run onto the draw-off drums. The hempen core, which is used almost universally with wire rope, is drawn through a central hole, and the plates rotate so as to twist the wires around it spirally. The finished strands, being wound on wheels, are sent to the flyers of the closing-machine, which lays them up into rope in a manner similar to the formation of the strands.

ROPEWAY. The elevated wire rope system which serves as a means of transport for suspended cars or carriers is known either as a ropeway, cableway, or, in more recent usage, a wireway. It is much used in new countries and mining regions, since it furnishes a method of transport that is both economical in first cost and in operation. It is suited especially to mining operations conducted on a mountain side, for carrying the products to some adjacent river. Where the grade is greater than one in seven, it may be operated wholly by gravity, the greater loads that come down from a mine being always sufficient to draw up the lesser loads that ascend. Trees may be trimmed up and used as points of support for the wire rope, or stout posts with cross-arms may be used at distances varying from 140 to 2,000 feet, the latter figure only where the grade is steep.

The carriers or buckets are hung from the rope by hangers or clips. Sometimes the rope is made stationary and the carriers rolled along, but the better and more common method is to use an endless rope, carried over large horizontal sheaves at the ends of the route. To this rope the carriers are hung, with automatic devices for dumping their contents at the proper points. About two hundred feet a minute is deemed the best speed for the rope, and if the line is run by gravity this speed is obtained by regulation with a brake. The rope must be supplied regularly with oil, to prevent its wearing out by internal friction, or by abrasion in rounding the sheaves. Ropeways on a smaller scale are used in many manufacturing plants, where the nature of the work or the separation of the buildings renders it convenient. When run by gravity they will

carry material two or three miles at an expense of only three or four cents a ton.

Ropeways for passenger travel have been built in various places, though they are not common. One, at Brighton, England, is built to cross a gorge, and sustains a car that carries twelve passengers at a trip. The construction of this is unusual, and resembles a suspension-bridge. There are towers on each side of the gorge, and an upper cable is hung over them in a graceful curve. Below is another cable, which maintains a horizontal line, being supported at short distances by small ropes connected with the upper cable. The car is hung from the lower cable, and is pulled back and forth by an endless rope driven by a steam-engine. The object of the arrangement, of course, is to afford a horizontal line of travel for the car, which otherwise would sag the rope in the center and require double power to elevate it during the last half of its journey.

Although the ropeway is not suited to carrying very heavy loads, it is superior to the railway in some respects. It does not interfere with the use of land over which it passes, so that it is only necessary to buy a right of way, and the cost of construction is no more where the land is uneven than where it is level.

ROQUEFORT CHEESE. See **CHEESE**, Vol. V, p. 456.

ROQUETTE, ADRIEN EMMANUEL, an American poet; born in New Orleans, Louisiana, Feb. 13, 1813; educated at the College of Nantes, France; studied law; was ordained a Roman Catholic priest, and passed most of his life in the service of a Choctaw mission and in a seminary of that church in New Orleans. He wrote in both French and English. Among his works are *Les Savanes*, *Poésies Américaines* (1841); *Wild Flowers* (1848); *La Thébaïde en Amérique* (1852); *Poèmes Patriotiques* (1860); and a satire on Cable's *Grandis-simes*. He died in New Orleans, July 15, 1887.

RORQUAL. See **WHALE**, Vol. XXIV, pp. 524, 525; and **FINBACK-WHALE**, in these Supplements.

ROSA, EUPHROSINE PAREPA, a British singer; born in Edinburgh, Scotland, May 7, 1836. She made her *début* at Malta in 1855, and appeared with success in London in 1857. In 1863 she married Captain Carvell, of the British army, but became a widow two years later. Then she visited the United States with the Bateman troupe, and again in 1866-67. She obtained here great popularity in oratorios and operas. In 1867 she was married to Carl Rosa, a violinist and member of the same troupe. With him she organized, in 1869, an English opera, which for three seasons made tours of the chief American cities. In 1872-73 she was at the Khedive's court at Cairo, and afterward made another tour in England, where she died, Jan. 21, 1874. She was a great beauty, and had a rich soprano voice of wide range.—Her husband, CARL AUGUST NICHOLAS ROSA, a German violinist; born in Hamburg, March 22, 1843. He received his musical training at the Leipzig Conservatory;

traveled as a solo-player in England and the United States. After the death of his wife, he continued in English opera with considerable success, and introduced many new pieces to London. He founded a \$5,000 scholarship in the Academy of Music in memory of his wife. He died April 30, 1889.

ROSA, FRANCISCO MARTINEZ DE LA. See SPAIN, Vol. XXII, p. 361.

ROSACEÆ, one of the largest and most important of the dicotyledonous families. It is characterized by its alternate leaves, regular flowers, usually numerous stamens, and one to many pistils. The principal great divisions, often regarded as families, are the almond or plum tribe, the rose tribe and the pear tribe. It furnishes the most important fruits of temperate climates, such as the apple, pear, quince, peach, plum, cherry, strawberry, blackberry, raspberry, etc., besides the showy roses of cultivation.

ROSA MONTE, a mountain on the borders of the Swiss canton of Valais, and the Italian provinces of Novara and Turin, at the east end of the Pennine Alps; the second highest mountain in the Alps, having as its highest peak the Dufour Spitze. Altitude 14,970 feet.

ROSANILINE. See ANILINE, Vol. II, p. 48.

ROSA OF LIMA OR ISABEL FLORES, the only canonized person of American nativity. See PERU, Vol. XVIII, p. 675, note.

RÖSCHER, WILHELM. See POLITICAL ECONOMY, Vol. XIX, pp. 391-401.

ROSCIUS QUINTUS. See DRAMA, Vol. VII, p. 412.

ROSCOE, SIR HENRY ENFIELD, an English scientific writer, grandson of Roscoe the historian; born in 1833, and educated at London and Heidelberg. He was professor of chemistry at Owens College from 1858 to 1886, and is distinguished chiefly for his investigations and discoveries relative to the chemical action of light and to the metal vanadium. In conjunction with Professor Schorlemmer he published a well-known *Treatise on Chemistry*. He also wrote *Lessons in Elementary Chemistry*, which has been translated into many languages; *Lectures on Spectrum Analysis*; *Chemistry Primer*; and published numerous articles and lectures in magazines. He became president of the British Association in 1887; was made an officer of the Legion of Honor in recognition of his services as a vice-president of the Paris Exposition; and in the same year was chosen president of the Midland Institute, Birmingham. He sat for South Manchester as an advanced Liberal in 1885, and was re-elected in 1886 and 1892.

ROSE. For general article, see ROSE, Vol. XX, pp. 850, 851; and also HORTICULTURE, Vol. XII, p. 260.

ROSE, HEINRICH, a German chemist; born in Berlin, Aug. 6, 1795. He was educated at Stockholm, and Kiel, where he graduated in 1821; was an instructor in the University of Berlin from 1822 till his death, being professor after 1835. His attention was devoted to analytic chemistry, which was advanced by him more than by any

other one man. In 1844 niobium was discovered by him. His chief publication was *Handbuch der Analytischen Chemie* (1829); but he wrote a great many papers, published mostly in Gilbert's *Annalen* and Poggendorff's *Annalen*. He died in Berlin, Jan. 27, 1864.

ROSE, MARIE. See MAPLESON, MRS. MARIE ROSE, in these Supplements.

ROSE ACACIA, the common name of *Robinia hispida*, a plant of the family *Leguminosæ*. It is an ornamental shrub, with bristly branches, broad leaflets, large, showy rose-colored flowers in racemes, and bristly pods. Its well-known congener is the common locust (*R. pseudacacia*).

ROSE-APPLES, the common name of *Eugenia jambos*, a plant of India, belonging to the myrtle family. It has opposite and long, shining leaves, clusters of large white flowers, with conspicuous long stamens, and a large, edible berry like a small apple.

ROSEBERRY, ARCHIBALD PHILIP PRIMROSE, EARL OF, an English statesman; born in London in 1847; succeeded his grandfather in 1868; was appointed a commissioner to inquire into endowments in Scotland in 1872; Under-Secretary of State, Home Office, in 1881-83; elected rector of the University of Edinburgh in 1880; and was Lord Privy Seal and First Commissioner of Works in 1885. On the accession to power of Mr. Glad-



LORD ROSEBERRY.

stone in the beginning of 1886, Lord Rosebery attained the post of Secretary for Foreign Affairs. He held the portfolio for only six months, until the fall of Mr. Gladstone's government in June. Lord Rosebery cast in his fortunes fully with Mr. Gladstone, and entirely agreed with his home-rule policy. He was a strong Liberal, and, though a peer, moved in 1884 for a select committee to inquire into the best means of improving the efficiency of the house of peers. He was a strong advocate of imperial federation, took a great interest in movements for the improvement of the social condition of the masses, and presented a magnificent swimming-bath to the people's palace in the East End of London. He was elected, with Sir John Lubbock, for the city division of the London county council Jan. 13, 1889, and on February 12th became chairman of that body. In 1892 he became Secretary of State for Foreign Affairs under Gladstone, succeeding him as Premier in March, 1894, which office he filled till the Liberals went out of power in June, 1895. In 1896 he retired from the leadership of the Liberal party. He is the author of a monograph on Pitt.

ROSE-BUG, same as ROSE-CHAFER. See COLEOPTERA, Vol. VI, p. 132.

ROSEBURG, a city and the capital of Douglas County, southwestern Oregon, on the Umpqua River, and on the Union Pacific railroad.

The surrounding country is a farming region, especially fruit and stock raising, and mining is carried on. The city contains flour-mills, breweries, wagon-shops, the Oregon State Soldiers' Home, a national bank, and newspapers. Population 1890, 1,472.

ROSECRANS, WILLIAM STARKE, an American soldier; born in Kingston, Ohio, Sept. 6, 1819. He



GEN. W. S. ROSECRANS.

1862, he was appointed major-general of volunteers. In May, 1862, he commanded a division of the Army of the Mississippi, at the siege of Corinth; and in September, after succeeding to the command of the whole Army of the Mississippi, he defeated General Sterling Price at Iuka, at the head of the Army of the Cumberland. He defeated Bragg at the battle of Murfreesboro, Tennessee, Jan. 2, 1863, his own exertions turning his previous defeat into a victory. On September 19th–20th he fought and lost the battle of Chickamauga, for which he was relieved of his command by General Grant, October 23d. In 1866 he was mustered out of the volunteer service. In 1881 he was elected to Congress from California, and served two terms. He was made Register of the United States Treasury in 1885, which office he held till 1893. In 1889 he was restored to the rank of brigadier-general and placed on the retired list.

ROSELLY DE LORGUES, ANTOINE FRANÇOIS FÉLIX, a French religious writer; born in Grasse, Aug. 11, 1805; was authorized, in 1860, to add de Lorgues to his name. He studied law, but gave it up for the study of religious questions and philosophy; received the cross of the Legion of Honor in 1837, and was made an officer in 1855. His writings include *Le Christ Devant le Siècle* (1835); *De la Femme et du Serpent* (1842); *La Croix dans les deux Mondes* (1844); *Christophe Colomb* (1856); and *Histoire Posthume de Christophe Colomb* (1885).

ROSE-MALLOWS. See INCENSE, Vol. XII, p. 718.

ROSENKRANZ, JOHANN KARL FRIEDRICH, a German philosopher; born in Magdeburg, Prussia, April 23, 1805. He graduated from Halle University in 1828, and in 1833 became professor of philosophy at Königsberg, occupying the chair formerly filled by Kant. He was a follower of Hegel, and spent much of his life in arranging and reclassifying the system. Among his works

are *A History of German Poetry in the Middle Ages* (1830); *Psychology, or Science of Subjective Mind* (1837); *Critical Explanation of Hegel's System* (1840); *Goethe and His Works* (1847); *Æsthetics of the Ugly* (1853); *Hegel as the National Philosopher of Germany* (1870); and *New Studies—Histories of Culture and of Literature* (1875). He died June 17, 1879.

ROSENTHAL, MORITZ, an Austrian pianist; born in Lemberg, Dec. 18, 1862. He studied under Mikuli, and gave his first concert at Vienna in 1876; was appointed pianist to the Roumanian court in 1878; created a sensation by his playing in St. Petersburg and Paris; has played in all the countries of Europe, but deferred his visit to England until 1895, when he made an immediate success.

ROSE OF JERICHO OR ROSE OF THE VIRGIN. See ROSE, Vol. XX, p. 851.

ROSE OF SHARON, a popular name for *Hibiscus Syriacus*, a plant of the mallow family and well known as the common Althæa of gardens. See also ALTHÆA, in these Supplements.

ROSEOLA OR GERMAN MEASLES. See MEASLES, Vol. XV, p. 658.

ROSES, WARS OF THE. See ENGLAND, Vol. VIII, pp. 327, 328.

ROSLYN, a residence village of southeastern New York, on Long Island, at the south end of Hempstead Harbor, 23 miles E. N. E. of Brooklyn, on the Long Island railroad. It has a classical school, and flour, planing and paper mills and a canning factory. The village was named by William Cullen Bryant, who had a residence there. Population 1890, 1,251.

ROSLYN, a town of Kittitas County, central Washington, 26 miles N. W. of the county seat, Ellensburg, on the Union Pacific railroad. Its main occupation is coal-mining, as it produces about two thousand tons per diem. Population 1890, 1,484.

ROSETTI, OR ROSETI, CONSTANTIN, a Roumanian patriot and poet; born in Bucharest, June 14, 1816. After a short term of service in the army, he devoted himself to writing poetry, translation, and political pamphlets. He joined the revolutionary forces in the uprising of 1848 and was forced to leave the country. The next few years he spent in Paris; at length was permitted to return to Roumania, where he engaged in journalistic work, founding a liberal journal and became prominent in political affairs. He was minister of the interior from 1878 to 1880. He died April 20, 1885.

ROSOLIC ACID, trioxy-diphenyl-tolyl-carbinol anhydride ($C^{20}H^{16}O^8$), is formed by treating rosaniline with nitrous acid. It is a phenol dye-stuff dissolving in alkaline solutions with red color, and is known by the trade-name of methylaniline. It is also used as an indicator in the laboratory.

ROSS, ALEXANDER MILTON, a Canadian naturalist and author; born in Belleville, Ontario, Canada, Dec. 13, 1832. He studied and practiced medicine in New York. During the Civil

War he served for a time as a surgeon in the Union army. Later he was employed by President Lincoln as a confidential correspondent in Canada. After the close of the war he went to Canada and began to collect and classify the fauna and flora of that country. He made an entomological collection of ten thousand species, and a botanical one of similar extent. Reptiles, fresh-water fishes, birds and animals he collected and classified by hundreds. In 1881 he was one of the founders of the Society for the Diffusion of Physiological Knowledge; was decorated by several foreign governments, besides receiving other honors, and belonging to numerous European societies. His works include *Recollections of an Abolitionist* (1867); *Birds of Canada* (1872); *Flora of Canada* (1873); *Mammals, Reptiles and Fresh-water Fishes of Canada* (1878); *Vaccination a Medical Delusion* (1885); and *Memoirs of a Reformer* (1893). Dr. Ross was a founder of the St. Louis Hygienic College of Physicians and Surgeons, and its professor of hygiene.

ROSSE, LAURENCE PARSONS, EARL OF, a British astronomer; born at Birr Castle, King's County, Ireland, Nov. 17, 1840. He succeeded to his father's title in 1867; was educated at Trinity College, Dublin, and at Oxford; was chancellor of Dublin University, and one of the senate of the Royal University of Ireland; was elected president of the Royal Dublin Society in 1887, and published numerous articles on various scientific subjects.

ROSSETTI, CHRISTINA GEORGINA, an English poet of Italian origin; was born in London in 1830. She was the daughter of the well-known commentator on Dante, and sister of Dante Gabriel, William Michael and Maria Francesca Rossetti. She began at an early age to write verse, marked by spiritual insight and a glowing imagination, held in check by the serious and reflective cast of her mind. She had some of the mystic qualities and not a little of the genius of her elder brother; in her songs, hymns and lyrics she has a woman's soulfulness, insight and grace of touch. Her chief published productions are *The Goblin Market, and Other Poems* (1862); *The Prince's Progress*, known in America as *The Pageant, and Other Poems* (1866-81); *Commonplace and Other Short Stories* (1870), in prose; *Sing-Song*, a nursery rhyme-book (1872); *Speaking Likenesses* (1874); *Annus Domini* (1874), a prayer and text for each day of the year; *Seek and Find, and Called to Be Saints* (1881); *Letter and Spirit* (1883); *Time Flies* (1886); and *The Face of the Deep* (1892). The three latter works were published in 1893 in one volume, under the title of *Verses*. Besides these, a volume of verse, entitled *New Poems*, was edited and published posthumously by her brother, W. M. Rossetti, in 1896. The volume has much of the poet's religious thought and diction, chastened by suffering, with occasional outbursts of a woman's passionate longing for human affection, which take their color from her brother's, Dante G. Rossetti's, voluptuous verse. A brief *Memoir of Christina G. Rossetti* appeared in 1895,

by Ellen A. Proctor, edited by W. M. Rossetti. She died Dec. 29, 1894.

ROSSETTI, WILLIAM MICHAEL, poet and art-critic, brother of Dante Gabriel and Christina Georgina Rossetti; was born in London, Sept. 25, 1829, and educated at King's College School, London. Mr. Rossetti, who long held a post in the English civil service, came to notice as a critic of fine art and literature in 1850. He was much engaged (together with his brother, Millais, Holman Hunt, Woolner and others) in "Pre-Raphaelite" art from its commencement in 1848; and he edited and wrote for *The Germ*, a magazine conducted by the Pre-Raphaelites in 1850. He published *Dante's Comedy, the Hell* (translated into blank verse, 1865); *Fine Art, Chieftly Contemporary* (1867), a volume of republished criticisms; an edition of *Shelley's Poetical Works* (1870; revised edition, 1878), with a memoir and a large body of notes; *Lives of Famous Poets* (1878), being brief biographies of British poets, from Chaucer to Tennyson, some of them reproduced from the series named *Moxon's Popular Poets*, with others added; an edition of the *Collected Works of Dante Gabriel Rossetti* (1887); a *Life of Keats* (1887), in the series of *Great Writers*; and *Dante Gabriel Rossetti as Designer and Writer* (1889). He also edited, with a memoir, *William Blake's Poems*, in the Aldine series; and in 1868 issued a selection from the *Poems of Walt Whitman*. Among his other works are a poem of modern life, *Mrs. Holmes Grey* (1869); and a *Criticism of Swinburne's Poems and Ballads* (1866). Mr. Rossetti delivered in 1875 a series of lectures on *Shelley's Life and Poems*, and on *The Wives of Poets*. In 1890 he published a copiously annotated edition of *Shelley's Adonais* in the Clarendon Press series; also editions at various times of Coleridge, Campbell, Keats and Milton. He also edited a collection of his sister, *Christina Rossetti's Poems* (1896). He wrote the article on *SHELLEY*, in this *ENCYCLOPEDIA* (see Vol. XXI, pp. 789-794), and contributed more than a score of other articles, the most of them treating of Italian painters.

ROSSI, ERNESTO, an Italian actor; born at Leghorn, in 1829; received his early education in his native town, and afterward studied law in the University of Pisa. Subsequently he entered the dramatic school which had just been founded by Gustavo Modena. After having appeared at Milan, Turin and other Italian cities, he went, in 1853, with Mlle. Ristori to Paris and Vienna, and then returned to his native country, where he established a dramatic company, of which he himself took the management. In 1866 he paid a second visit to Paris, appeared at the Théâtre Français in an Italian translation of *The Cid*. After having visited Portugal and Spain, he returned to Paris in 1875, and gave at the Salle Ventadour, with remarkable success, a series of Shakesperian representations, in which he himself played the leading parts. He next visited London, where he met with an encouraging reception; traveled in South America with great

success; and in the United States in 1881, but was not so well received. Signor Rossi, who was styled the "Italian Talma," wrote some dramatic pieces of no great merit. He was decorated with the Cross of SS. Maurice and Lazarus. He died at Pescara, Italy, June 4, 1896.

ROSSITER, THOMAS PRITCHARD, an American painter; born in New Haven, Connecticut, Sept. 29, 1817. He was a pupil of Jocelyn in New Haven, and opened a studio there; studied abroad (1840-46) and again (1853-56); settled in Cold Springs, New York, (1860); received a gold medal at the Paris Exposition (1855); and was a national academicien. Some of his paintings were *The Return of the Dove to the Ark*; *The Wise and Foolish Virgins*; *Venice in the Fifteenth Century*; and *The Home of Washington*. He died May 17, 1871.

ROST, REINHOLD, a German Orientalist; born in Eisenberg, Saxe-Altenburg, Feb. 2, 1822. He was educated at Jena and Altenburg; went to England in 1847; was appointed Oriental lecturer in St. Augustine College, Canterbury, in 1850; secretary to the Royal Asiatic Society in 1863; and librarian to the Indian Office in 1869, which post he held till 1893. He wrote numerous articles, among them SIAM-LANGUAGE AND LITERATURE, for this ENCYCLOPÆDIA; and edited H. H. Wilson's *Essays on the Religion of the Hindus and on Sanskrit Literature* (1859-65); Trübner's series of *Simplified Grammars* (1882-88); and the *Oriental Record*. He was a member of numerous societies throughout Europe, such as the Royal Asiatic Society, a fellow of the Prussian Order of the Crown and the Swedish Order of the North Star. He died in Canterbury, England, Feb. 7, 1896.

ROSTRA, platforms. See ROME, Vol. XX, p. 816.

ROT, a general name in plant pathology, applied to the diseases which follow the attacks of parasitic fungi, as bitter-rot of apples, black-rot and other rots of grapes, potato-rot, plum-rot, tomato-rot, root-rot, dry-rot of timber, etc.

ROTARY MAGNETIC FIELD. See ELECTRICITY, § 89, in these Supplements.

ROTARY PRESSES. See TYPOGRAPHY, Vol. XXIII, pp. 707, 708; and PRESSES, in these Supplements.

ROTARY TRANSFORMERS. See ELECTRICITY, § 77 in these Supplements.

ROTATION OF CROPS. See AGRICULTURE, Vol. I, pp. 340, 341.

ROTATORIA, same as ROTIFERA. Vol. XXI, pp. 4-8.

ROTCH, ABBOTT LAWRENCE, an American meteorologist; born in Boston, Massachusetts, Jan. 1, 1861; entered the Boston Institute of Technology; founded at his own expense the Blue Hills Observatory, in Massachusetts, 1885; was associate editor of *The American Meteorological Journal* (1886-92); represented the United States at the Paris Exposition (1889); appointed chevalier of the Legion of Honor; member of the international meteorological committee on the classifica-

tion and nomenclature of the clouds (1891). His observations made at the Blue Hill Observatory have been accepted all over the Eastern states.

ROTHERMEL, PETER FREDERICK, an American painter; born in Luzerne County, Pennsylvania, July 18, 1817; was educated for a land surveyor, but turned his attention to portrait-painting, and afterward to the painting of historical subjects, often taken from American and related history. In 1873-75 he visited Europe and painted in Italy. Among his works are *De Soto Discovering the Mississippi*; *Patrick Henry before the Virginia House of Burgesses*; *The Battle of Gettysburg*; *The Martyrs of the Colosseum*; *St. Paul Preaching on Mars Hill*; *King Lear*. For color and composition his work ranks him among the first.

ROTHSCHILD, the name of several of the members of the great financial house which Mayer Anselm Bauer established from 1743 to 1812, and whose descendants have had much to do in the financial affairs of Europe. (For an account of the earlier members, see ROTHSCHILD, Vol. XXI, p. 3.)—ALFRED DE ROTHSCHILD, son of Baron Lionel de Rothschild, was born July 20, 1842, and educated at Cambridge, England. He was a member of the firm of N. M. Rothschild and Sons, a director of the Bank of England, and consul-general of the Austro-Hungarian Empire. His collection of Dutch, French and old English pictures, Sèvres china, furniture, bronzes, enamels and metal work was catalogued in 1885 in a work of two volumes. Among his pictures were Greuze's *Le Baiser Envoyé*; Teniers' *The Marriage of Teniers*; Gainsborough's *Mr. and Mrs. Villebois*; and Romney's *Mrs. Tickell*.—FERDINAND JAMES DE ROTHSCHILD, son of Baron Aurelius Rothschild; born in Paris, Dec. 17, 1839, and educated at Vienna. A resident in England, he was returned member of Parliament in 1885, in 1886 and again in 1892. In 1883 he was made high-sheriff of Buckinghamshire, and a peer in 1885. His collection of works of art contained Romney's *Mrs. Jordan*.—NATHANIEL MAYER DE ROTHSCHILD, eldest son of Baron Lionel Nathan de Rothschild, was born in London, Nov. 8, 1840, and educated at King's College School, London, and Trinity College, Cambridge. He was elected to Parliament for Aylesbury in 1865, which seat he retained until 1885, when he was created a peer. He was at the head of the banking-house of N. M. Rothschild and Sons. His collection of paintings included Gainsborough's *Mrs. Sheridan*; *Squire Hilyard and His Wife*, and *Mrs. Hibbert*; and Sir Joshua Reynolds's *Mrs. Lloyd*.

ROTTENSTONE. See GEOLOGY, Vol. X, p. 232.

ROTTERDAM, the second largest city and the commercial center of the Netherlands, and the capital of South Holland. The trade of Rotterdam has in recent years grown rapidly. In 1888 the quays measured 15 miles in length, and the docks covered an area of 190 acres. Since then other docks have been made and wharves extended. The new waterway of the

Hook of Holland, first used by ocean steamers in 1872, has been deepened to over 22 feet, and vessels have ceased to approach the city by the old channel. In 1890 it was estimated that, taking all the vessels that entered all the ports of Holland from abroad, more than 53 per cent (tonnage) entered at Rotterdam. The net tonnage of the vessels (which numbered 4,535 in 1890) so entering doubled between 1875 and 1890, and was in the latter year eight times what it was in 1850. To this foreign trade should be added 84 per cent. of the total trade between Germany and Holland by the way of the Rhine and a traffic carried on the canals and streams. If all these items be put together, the total tonnage of vessels entering Rotterdam in 1890 amounted to 12,500,000 tons, a figure that was only excelled by London among European ports. The figures quoted do not include the returns of the fishing-fleet, which sold in Rotterdam in 1890 fish to the value of \$95,000. The merchant fleet of Rotterdam itself numbered in 1890 86 vessels of 117,208 tons. In 1894 the total tonnage of vessels entering and clearing Rotterdam was 5,443,104 tons, or about forty per cent of the carrying trade of the Netherlands. Rotterdam sends to the Dutch Eastern possessions and to the West Indies provisions, spirits, wines, mineral waters and manufactured goods, in return for coffee, sugar, spices, cotton, dye-woods, etc. To England and Scotland, with which it carries on an extensive and lucrative trade, it sends cheese, butter, flax, madder, seeds, fruits, ducks, and large numbers of sheep and cattle. With America and with France, Spain, Portugal and the northern states of Europe it has also a considerable trade. Along the Rhine it sends to Germany and Switzerland sugar, coffee, cotton, butter, cheese, dye-woods, indigo, spices, Dutch tobacco, rape-seed, madder, fish, etc., in return for wheat, rye, Moselle and Rhine wine, pipe-clay, pottery ware, chemical stuffs, etc. Rotterdam has distilleries, windmills and sugar-refineries, besides important manufactures of iron, soap, sail and hair cloths, cigars, vinegar, liquors and jewelry. It is a very important market-center for tobacco, coffee, grain, indigo and petroleum. Population 1896, 228,597. For general description, see ROTTERDAM, Vol. XXI, p. 9.

ROUBLE OR RUBLE. See MONEY, Vol. XVI, p. 732.

ROUDAIRE, ELIE, (1836-85), a French engineer. See SAHARA, Vol. XXI, p. 151.

ROUGÉ, OLIVER CHARLES CAMILLE EMMANUEL, VICOMTE DE, a French Orientalist; born in Paris, April 11, 1811. He devoted himself to Oriental studies, particularly to Hebrew, Arabic, and Coptic, and finally to Egyptology exclusively. In 1849 he became keeper of Egyptian antiquities in the Louvre, and was the first to attempt the translation of long Egyptian texts from papyrus. He became member of the French Institute in 1853 and professor of Egyptology in the Collège de France in 1860. He is credited with

the discovery of the Egyptian doctrine of immortality. One of his published works traces our modern alphabet through the Greek and Phœnician back to an Egyptian source. Among his historical works is *Recherches sur les Monuments qu'on peut attribuer aux Six Premières Dynasties de Manéthon* (1866); and upon Egyptian religion and mythology: *Explication d'une Inscription Égyptienne, prouvant que les Anciens Égyptiens ont Connu la Génération du Fils du Dieu* (1851). He died in Bois Dauphin, Dec. 31, 1872.

ROUGE-ET-NOIR, a game of chance played by the aid of cards on a table covered with green cloth. The table is divided into four portions, each marked in the center with a diamond-shaped space, alternately red and black; hence the name, *rouge-et-noir*—red and black. Each player must stake his money on some one of the four chances, the *noir*, the *rouge*, the *couleur* and the *l'inverse*. After the stakes have been placed, cards are dealt for the *noir*, the *rouge*, etc., till the value of the spots, or "pips," exceeds 30. If the value of the cards for *noir* is nearer 31 than that for *rouge*, *noir* wins, etc. *Couleur* wins if the first card tabled is of the winning color and *noir* wins; if not, *couleur* loses. The winning players have their stakes increased by an equal sum from the bank, and then withdraw their stakes and winnings, while the stakes of the losers are raked to the bank. When the points dealt for the *noir* and the *rouge* each amount to 31, the half of all the stakes on each of the chances belongs to the bank, and this the players may either pay or have their stakes "put in prison," the next deal determining whether they shall belong to the bank or be restored to the player. Were it not for this regulation the game would be about even between the players and the bank. This game succeeded *faro* in France in 1789, but was forbidden by law in 1838.

ROULETTE, a game of chance played on a table in the center of which is a bowl-shaped cavity, about two feet in diameter, whose sides are divided into 38 compartments, painted black and red alternately. The bottom of the bowl revolves on a central axis. When the movable bottom is put in motion, an ivory ball is thrown into the cavity, and when the movement ceases the ball falls into one of the compartments at the sides. At the ends of the table are 38 spaces into which the players place their stakes. These spaces are numbered correspondingly with the numbers in the compartments of the wheel, viz., 1 to 36 and a single and a double 0. The numbers are alternately red and black. Besides playing the numbers, the player can put his stake on either the red or the black, and receive, in case the ball falls into a red compartment and his stake is on the red, an amount equal to what he has played. He can also play an odd or even number in the same way, or again the high and the low. If he plays the high, he is betting that the ball will fall in a number above 18 to 36; if the low, a number from 1 to 18. When the player puts his stake on any single number and the ball

falls in the corresponding number in the wheel, he receives 36 times the amount of his stake. The bank in an American game of roulette has a larger percentage than that of the French one, from the fact that the former uses both the single and the double 0, while the latter use but the single 0. In the event that the ball should fall in either the single or the double 0, the bank claims every bet on the table unless a player has a bet on either the single or double 0, when he receives 36 times the amount of his stake. There are further regulations, by which a player receives 18 times his stake if he plays 2 numbers, 12 times if 3 numbers, etc. The game is 19 to 18 in favor of the bank, but other ways of playing it vary the proportion. This game was forbidden by law in 1838 in France, and in 1873 in Germany. It is proscribed in Great Britain and the United States by their respective gambling-laws.

ROUMANIA. (For general article, see *ROUMANIA*, Vol. XXI, pp. 14-21.) The area and population are known only by estimates. The total estimated area is 48,307 square miles, and the estimated population in 1893 was 5,800,000. The people themselves, though of mixed origin, may now be regarded as homogeneous. Roumanians are spread extensively in the neighboring countries—Transylvania, Hungary, Servia, Bulgaria; their total number probably is between nine and ten millions. Included in the population of Roumania proper are 4,500,000 Roumanians, 300,000 Jews, 200,000 gipsies, 50,000 Bulgarians, 20,000 Germans, 1,500 Magyars, 15,000 Armenians, 2,000 French, 1,000 English, besides about 3,000 Italians, Turks, Poles, Tartars, etc.

The constitution in force in 1896 was voted by a constituent assembly, elected by universal suffrage in the summer of 1886. It has twice been modified—the last time in 1884. The Senate consists of 120 members, elected for 8 years, including 2 for the universities, and 8 bishops. The Chamber of Deputies consists of 183 members, elected for four years. A senator must be 40 years of age, and a deputy 25. Members of either house must be Roumanians by birth or naturalization, in full enjoyment of civil and political rights, domiciled in the country. For the Senate an assured income of about \$2,000 is required. All citizens of full age, paying taxes, are electors, and are divided into three electoral colleges. For the Chamber of Deputies, electors who are in possession of property bringing in \$250 or upward per annum vote in the first college. Those paying direct taxes to the state of \$4 or upward annually, vote in the second college, as well as persons exercising the liberal professions, retired officers, state pensioners and those who have been through the primary course of education. The third college is composed of the remaining electors, of whom those not knowing how to read or write vote indirectly. For the Senate there are only two colleges. The first consists of those electors having property yielding annually at least \$400; the second, of those persons other-

wise eligible, but whose income from property is from \$160 to \$400 per annum.

REIGNING KING AND ROYAL FAMILY. Carl I, King of Roumania, was born April 20, 1839, a son of Prince Karl, of Hohenzollern-Sigmaringen. He was elected "Domnul," or Lord of Roumania, April 20, 1866, and accepted his election May 22, 1866; was proclaimed King of Roumania, March 26, 1881; was married Nov. 15, 1869, to Princess Elizabeth von Neuwied, born Dec. 29, 1843.

The succession to the throne of Roumania, in the event of the king remaining childless, was settled, by article 83 of the constitution, upon his elder brother, Prince Leopold of Hohenzollern-Sigmaringen, who renounced his rights in favor of his son, Prince Wilhelm, the act having been registered by the Senate in October, 1880. Prince Wilhelm, on Nov. 22, 1888, renounced his rights to the throne in favor of his brother, Prince Ferdinand, born Aug. 24, 1865, who, by a decree of the king, dated March 18, 1889, was created "Prince of Roumania."

The king has an allowance of about \$237,000.

EDUCATION AND RELIGION. Education is free and compulsory where there are schools. According to the published summaries of 1893, there were 3,659 primary schools, with 221,000 pupils. There were 8 normal schools and 52 high-schools, and 2 universities, the latter at Bucharest and Jassy.

Of the total population of Roumania proper it is estimated that 4,950,000 belong to the Orthodox Greek Church, 150,000 are Roman Catholics, 13,800 Protestants, 15,000 Armenians, 10,000 Lipovani (Russian heretics), 300,000 Hebrews, 20,000 to 30,000 Mohammedans. The government of the Greek Church rests with two archbishops, the first of them styled the Primate of Roumania and the second the Archbishop of Moldavia. There are, besides, six bishops of the National Church and one Roman Catholic bishop.

FINANCE. The chief sources of revenue consist in direct and indirect taxes and the profits derived from the extensive state domains and valuable salt-mines, and the salt and tobacco monopolies. The capitation tax is six lei per head. There is an income tax of 6 per cent on houses, 5 per cent on property farmed by a resident owner, 6 per cent for property let by an owner resident in Roumania, and 12 per cent for estates of non-resident owners. The revenue and expenditure for the year 1894-95 were \$40,634,153. The budget estimate for 1895-96 was \$41,960,000. The unit of value is the lei, equivalent to twenty cents.

The public debt of Roumania amounted on April 1, 1895, to \$235,637,196. Of the total amount, more than half has been contracted for public works, mainly railways. The remainder has been contracted to cover the deficits, reduce unfunded debt and pay peasant freeholds.

ARMY AND NAVY. The entire military strength of Roumania is divided into permanent, territorial, militia and *levée en masse*. The strength of the permanent army in time of peace is 3,000 offi-

cers, 335 employees, 48,500 men, 13,200 horses and 600 guns. The total of the territorial army is 81,843 men and 4,401 horses. The militia consists of 33 regiments of infantry. Strength of the *levée en masse* is not definitely fixed.

Every Roumanian from his 21st to his 46th year is obliged to serve either in the permanent army three years of active service, or in the territorial infantry five years of active service, or in the territorial cavalry four years of active service, and afterward, till the age of 30, serve in the reserve of the army to which he belongs. The entry into the permanent or territorial army is decided by lot. All young men not taken for the conscription form part of the militia. After completing their service in the permanent or territorial army, all are enrolled in the militia until their 36th year.

Roumania has in the navy the *Elizabeta*, a shot-protected cruiser of 1,320 tons displacement and 4,500 horse-power, 3½-inch armor at the belt; four 6-inch and eight machine guns; the *Mircea*, training-ship, a composite brig of 350 tons, a yacht of 350 tons, a dispatch vessel, four gunboats of 110 tons, five of 45 tons, a screw steamship and five torpedo-boats. There are about 50 officers and 1,600 seamen.

The total number of vessels that entered the ports of Roumania in 1894 was 33,044, of 8,957,912 tons, and the number that cleared was 33,291, of 8,919,380 tons. In 1895 Roumania's merchant navy included 323 vessels of 63,868. In 1895 there were 1,617 miles of railway, the state conducting all of it. The imports for 1894 were valued at 422,142,000 lei, the exports at 294,198,000 lei.

ROUMANIAN LANGUAGE. See ROMANCE LANGUAGES, Vol. XX, p. 668.

ROUMANILLE, JOSEPH, a French poet; born in St. Remy, Bouches-du-Rhône, Aug. 8, 1818; professor in a Tarascon school; finally settled in Avignon as a bookseller. While at Tarascon he wrote a poem in the Provençal language to please his mother, who could not understand his French verse. The title of the work was *Jeyè*, and its literary style was the revival of a form of speech once common in France, but obsolete at this time except among certain country people. A coterie intent on a Provençal renaissance soon gathered about him, which took the name of the *Félibres*, and of it Frédéric Mistral became the chief ornament; Roumanille, at the time of his death, was its Capoulié. He wrote *Oubrets en Vers*, *Lou Curat de Cucugna*, and *Lou Abal Tabuissoun*. His writings are characterized by the blithe gayety and the monkish paganism of troubadour times—quaint, sincere and humorous in their childlike artlessness. He died in Avignon, May 24, 1891.

ROUNDHEAD. See WHIG AND TORY, Vol. XXIV, p. 540.

ROUND-TABLE. See ARTHUR, Vol. II, p. 649.

ROUND-TABLE CONFERENCE, THE. See HOME RULE, in these Supplements.

ROUPHI or RUPHIA, a river. See ALPHEUS, Vol. I, p. 615.

ROUSE'S POINT, a village of Clinton County,

northeastern New York, near the Canadian frontier, on Lake Champlain at its northern extremity, and on the Central Vermont, the Delaware and Hudson and the Grand Trunk railways, 24 miles N.E. of Plattsburg and about the same distance from St. Albans, Vermont. The village carries on an extensive lake commerce with Canada, and receives most of the customs duties for the Champlain district. It has railway repair-shops, a large printing-establishment, and manufacturing of smoking-pipes and lumber. At this point the Vermont Central crosses Lake Champlain by a bridge nearly a mile long, erected at a cost of over three hundred thousand dollars. Population 1890, 1,856.

ROUSSEAU, LOVELL HARRISON, an American lawyer and soldier; born in Lincoln County, Kentucky, Aug. 4, 1818; received little education when young; studied law, and was admitted to the bar in 1841; member of the Indiana legislature 1844-45; and of the state senate in 1847; raised a company of Indiana troops for the Mexican war; became a successful criminal lawyer in Louisville, Kentucky; as a member of the Kentucky senate opposed both secession and neutrality, and raised the Third Kentucky Union infantry regiment, of which he became colonel, September, 1861. He distinguished himself at the battle of Shiloh, April 7, 1862, and afterward at Perryville, Kentucky, Oct. 8, 1862, when he was made major-general of volunteers. He was a member of Congress in 1865; in March, 1867, was appointed brigadier-general in the regular army and brevetted major-general; in 1868 he was assigned to the command of the department of Louisiana, where he died Jan. 7, 1869.

ROUSSEAU, PHILIPPE, a French painter; born in Paris, France, Feb. 22, 1816; pupil of Bertin and Baron Gros; received medals at the Salon in 1845 and 1848, and at the Paris Exposition of 1855 and 1878; an officer of the Legion of Honor in 1870. His works are found in museums of Chartres, Valenciennes and Nantes, and in the Luxembourg gallery, Paris. He died at Acquigny, Dec. 4, 1887.

ROUSSET, CAMILLE FÉLIX MICHEL, a French historian; born in Paris, Feb. 15, 1821; became professor of history at Grenoble in 1845, next at the Collège Bourbon (afterwards called the Lycée Bonaparte), from 1845 to 1863, and in 1864 was appointed historiographer and librarian to the ministry of war. On Dec. 30, 1871, he was elected a member of the French Academy. M. Rousset was the author of *Précis d'Histoire de la Révolution Française* (1849); *Histoire de Louvois et de son Administration politique et militaire* (4 vols., 1861-63), a work which in three consecutive years gained the first Gobert prize of the French Academy; *Histoire de la Guerre de Crimée* (1877); and other works. He died Oct. 20, 1892.

ROUTH, MARTIN JOSEPH, an English clergyman and educator; born in South Elmham, Suffolk, Sept. 18, 1755. After graduating at Oxford in 1774 he held various college positions until he became president of Magdalen College in 1791,

which post he retained nearly sixty-four years. In 1810 he was presented the living of Tylehurst, Berkshire. Routh published an edition of Plato's *Enthydemus et Gorgias*; edited Burnet's *History of His Own Times*; and a volume of *Scriptorum Ecclesiasticorum Opuscula* (1832). But he was best known by his valuable collection of the fragmentary writings of the Christian Fathers of the 2d and 3d centuries under the title, *Reliquiæ Sacræ* (4 vols., 1846-48). He died in Oxford, Dec. 22, 1854.

ROUTING-MACHINE. A mechanism for cutting away portions of a surface, as of wood. It is used to lower the blank spaces of engravings, for various gaining operations, for letting in the risers and treads of stairways, and for numerous operations in cabinet work. A stout upright column bears a hinged framework, at the extremity of which is the rotating cutter. The frame is powerfully braced, to avoid spring, and the cutter is driven by means of pulleys on the column, at the hinges and on its own spindle, these pulleys being connected by belts. This arrangement allows the cutter full play horizontally anywhere within the swing of the frame. Handles are placed on the frame for guiding the cutter according to the will of the operator, and a screw is provided for feeding the cutter-spindle to its work.

ROVE-BEETLES, the popular name for the beetles of the family *Staphylinidæ*. They are small insects, with very short wing-covers (*elytra*). Representatives of the family are common under stones and other objects.

ROVING. See COTTON MACHINERY, Vol. VI, pp. 495, 496.

ROWAN, STEPHEN CLEGG, an American naval officer; born near Dublin, Ireland, Dec. 25, 1808; appointed midshipman in the United States Navy, Feb. 15, 1826, when he was a student at Oxford College, Ohio; served with distinction on the coast of Mexico in the war with that country, being made lieutenant. In 1855 he was promoted to commander. He performed efficient service on the Potomac and afterward on the coast of North Carolina, where he conducted, in 1862, several successful expeditions in co-operation with General Burnside. On July 16, 1862, Rowan was commissioned captain, and for his conspicuous gallantry promoted to commodore. He next commanded off Charleston, South Carolina, and in many months of constant conflict with the enemy increased his reputation. He received a vote of thanks from Congress, and in July, 1866, was promoted to rear-admiral in recognition of his eminent services. In 1866-67 he commanded the Norfolk navy-yard; in 1868-70 was commander of the Asiatic squadron, and while on this duty was promoted to vice-admiral. From 1872 to 1879 he was in command of the naval station at New York; in 1879-81 president of the board of examiners; and in 1882 became superintendent of the naval observatory. After January, 1883, Admiral Rowan was chairman of the lighthouse board at Washington, District of Columbia. He died in 1890.

ROWAN-TREE. See ASH, Vol. II, p. 680.

ROWBOTHAM, JOHN FREDERICK, a British musical historian; born in Edinburgh in 1852; educated at Edinburgh Academy, Rossall School and Balliol College, Oxford, where he graduated; resided in Germany several years studying music and collecting materials for a history of music; a student of mediæval poetry. His *History of Music*, published in London in 1885, treats of prehistoric music and the music of the Assyrians, Egyptians, Hebrews, Chinese, Indo-Chinese, etc.; of the Greeks and of the Christian era as far as the time of Guido d'Arezzo. The author's enthusiasm for his subject gives to his writings a style always animated and at times eloquent. He has contributed to the *Nineteenth Century* and other leading periodicals.

ROWING. In recent years no radical modifications have been made in the style of boat used. They are mostly built of cedar or some such wood, although a few American crews have tried paper boats; but these have not been very popular. Aside from this, the only general improvement has been in the seat. All oarsmen now use a seat on rollers instead of the old sliding style.

The chief rowing events in England are still the annual race between Oxford and Cambridge, and the international regatta at Henley. In the former, beginning with 1886, Cambridge won four years in succession, but since then Oxford has made seven straight wins, and in 1893 established a new record of 18 minutes and 47 seconds for the course. Out of 52 races between them Oxford has now won 30 and Cambridge 22 races. At Henley the interest was much heightened in 1895 by the appearance of the Cornell College crew from America, and in 1896 by the entrance of Yale and by the appearance of Dr. McDowell of Chicago.

In America rowing has existed since the beginning of the century, but the interest in crews was purely local until after 1850, when the leading colleges took up the sport. The first intercollegiate boat race was between Yale and Harvard, on Lake Winnipiseogee, Aug. 3, 1852. Since then various college associations have existed, sometimes including one set of colleges and sometimes another, and at one time (1872) one existed having 11 colleges represented. In 1876 Yale and Harvard formed a dual association, which existed until 1895, when it was discontinued. All except the first two of these races, which were rowed at Springfield, were rowed at New London. Out of 20 races Yale won 13 and Harvard 7, and the best time, 20 minutes 10 seconds, made in 1888, was by Yale. This is also a world's record for four miles with 8-oared shells. In 1890 Cornell and the University of Pennsylvania formed an association, and in 1895 included Columbia. Up till the latter year Cornell had always won, but her best crew was at Henley in that year, and Columbia won; while Cornell's crew in England was not fortunate enough to win. In 1896 Yale's crew was in England, when they met defeat, so the Cornell-Columbia-Pennsylvania Association included Harvard, Cornell winning.

Harvard and Columbia also established an asso-

ciation for freshmen crews in 1880, which lasted till 1896, when they included the Cornell freshmen, who before had always won from Pennsylvania. Yale also rowed from 1891 to 1895, but in 1895 the University of Wisconsin, which for a number of years had supported a crew, sent it east and defeated the Yale freshmen. Among the colleges one of the most remarkable records is that of Cornell, which out of 43 intercollegiate races, including freshmen, since 1873 has only lost 9.

The National Association of Amateur Oarsmen, formed in 1873, holds an annual regatta at Saratoga, which is the chief rowing attraction of the year outside of the intercollegiate contests. The events competed are as follows: Single-scutt shells, senior; single-scutt shells, junior; pair-oared shells; double-scutt shells; 4-oared shells, senior; 4-oared shells, junior; 8-oared shells, senior; 8-oared shells, junior. This association has a membership of 93 clubs, in all parts of the country.

ROWLAND, HENRY AUGUSTUS, an American physicist; born in Honesdale, Pennsylvania, Nov. 27, 1848; graduated at Rensselaer Polytechnic Institute in 1870 as civil engineer; assistant professor of physics in his alma mater in 1874; studied one year with Helmholtz, in Berlin; in 1876 accepted the chair of physics in Johns Hopkins University, with charge of the laboratory, which institution in 1880 conferred on him the honorary degree of Ph.D.; served on the jury of the electrical exhibition at Paris in 1881; the same year elected to the National Academy of Science; associate of the American Academy of Arts and Sciences and received from that society the Rumford medal for his researches in light and heat; corresponding member of the British Association for the Advancement of Science; in 1883 presided over the section of physics of the American Association for the Advancement of Science. He made many important discoveries in optics and electricity, invented superior methods of photographing the solar spectrum, and wrote many valuable papers on those subjects, among which are *Studies on Magnetic Distribution* (1875); *Research on the Absolute Unit of Electrical Resistance* (1878); *On Concave Gratings for Optical Purposes* (1883); and *Photographs of the Normal Solar Spectrum* (1886). The article on SCREWS (see Vol. XXI, p. 553), in this *ENCYCLOPÆDIA*, was from his pen.

ROYAL, JOSEPH, a Canadian public man; born in Repentigny, Province of Quebec, May 7, 1837; educated at Jesuits' College, Montreal; admitted to the bar in 1864. From 1857 to 1871 he edited several journals; in 1877 was appointed commissioner for the consolidation of the statutes of Manitoba; was a member of the legislature of Manitoba from 1870 to 1879; in 1871 its first speaker, and held the office of Provincial Secretary (1872-74); Minister of Public Works (1874-76); Attorney-General (1874-78). He was a member of the Dominion Parliament from 1879 to 1888, when he was appointed lieutenant-governor of the Northwest Territories. He was the first superintendent of education for Manitoba, the author of the school law (1871), and after 1877 was vice-chancellor of Manitoba University. To him is due largely the readjustment

of the financial affairs of Manitoba with the Dominion (1875). He made many valuable contributions to French-Canadian literature.

ROYAL ACADEMY. See *ACADEMY*, Vol. I, p. 78.

ROYAL ARCANUM. See *BENEFIT SOCIETIES*, in these Supplements.

ROYAL GEOGRAPHICAL SOCIETY. See *GEOGRAPHY*, Vol. X, p. 193.

ROYAL INSTITUTION. See *SOCIETIES*, Vol. XXII, p. 222.

ROYAL SOCIETY. See *SOCIETIES*, Vol. XXII, p. 222.

ROYAL TEMPLARS OF TEMPERANCE. See *BENEFIT SOCIETIES*, in these Supplements.

ROYCE, JOSIAH, an American educator and author; born in Grass Valley, California, Nov. 20, 1855. He received his education at the University of California and at Göttingen, Leipsic, and Johns Hopkins universities. In 1878 he was instructor in English in the University of California; in 1882 of philosophy in Harvard College, assistant professor in 1885, and professor in the history of philosophy in 1892. He wrote *The Religious Aspect of Philosophy* (1885); *California* (1886); *The Spirit of Modern Philosophy* (1892); and other articles and lectures.

ROYER'S FORD, a village of Montgomery County, southeastern Pennsylvania, opposite Spring City, and 15 miles W. of Norristown, on the Schuylkill River, and on the Philadelphia and Reading railroad; has extensive stove factories, and glass and agricultural-implement works. Population 1890, 1,815.

ROZE, MARIE. See *MAPLESON*, in these Supplements.

RUATAN OR ROATAN. See *HONDURAS*, Vol. XII, p. 131.

RUBERYTHRIC ACID. A complex substance found in the madder-root, which breaks up into glucose and alizarin.

RUBIACEÆ, an exceedingly large family of gamopetalous plants, containing almost five thousand species, mostly tropical or sub-tropical, and especially American. No external characters can easily distinguish the family, as in many other families, the opposite leaves and interpetiolar stipules probably being the best index. The great subdivisions of the family, sometimes regarded as distinct families, are the *Cinchonææ*, to which belong the cinchona (quinine) and its allies; the *Coffeææ*, the coffee-plant and its allies; the *Spermacocææ*, a small group of weeds, chiefly tropical; and the *Stellatææ*, the most northern group of the family, and chiefly represented in our flora by the species of *Galium* or cleavers.

RUBIAN. See *MADDER*, Vol. XV, p. 176.

RUBICELLA. See *Spinel*, under *MINERALOGY*, Vol. XVI, p. 386.

RUBICON, a small river of northern Italy, flowing into the Adriatic, which in 49 B. C. formed the southern boundary of the province governed by Julius Cæsar. For Cæsar to cross it with his army at the outbreak of the civil war between him and Pompey would virtually have been a declaration of war against the republic; hence, "to cross the Rubi-

con" has come to mean to take a step which cannot be retraced, to commit one's self to a momentous and hazardous undertaking. It is not certainly known whether the modern Luso or the Fiumicino was the ancient Rubicon, but there is a preponderance of evidence in favor of the latter. See ITALY, Vol. XIII, p. 437.

RUBIDIUM. See POTASSIUM, Vol. XIX, pp. 592, 593.

RUBIN, a dye. See FUCHSINE, in these Supplements.

RUBINSTEIN, ANTON GREGORIEVICH, a European composer and pianist; born of Jewish parents in Wechwotnyetz, Roumania, Nov. 30, 1830. His first instruction in music was by his mother, and afterward his teachers were Villoing in Moscow, Liszt in Paris, and Dehn in Berlin. After teaching in Vienna and Berlin, he settled in St. Petersburg in 1848. He made a concert tour in 1857, and by his works and playing created a



ANTON RUBINSTEIN.

sensation. In 1858 he became Imperial Concert conductor, with a life-pension, and in 1862 founded in St. Petersburg a conservatory of music and was its principal till 1867. In 1872-73 he visited the United States and European countries in concert tours; was ennobled in 1869; awarded the decoration of the Legion of Honor in 1877, and was given a grand jubilee fête in St. Petersburg in 1889. He resigned the directorship of the Conservatory in 1890. He wrote 15 operas, some sacred, as, *Paradise Lost* and *Moses*; six symphonies, as, the *Ocean* and the *Dramatic*, besides numerous overtures, sonatas, concertos, vocal pieces, etc. He published in 1890, *Autobiography of Anton Rubinstein*. His compositions are characterized by the lyric, rhythmic and formal elements over the dramatic; by melodiousness, an absence of meretricious effects and a tendency to great length. His style had several points of likeness to Schubert's, in feeling was more akin to Mendelssohn, and strongly opposed to the principles of Wagner. As a pianist he held highest rank—his mastery of technique being supreme, the feeling and significance he imparted to the simplest pieces showing musical sensibility both intense and sympathetic. He died in Peterhof, Russia, Nov. 20, 1894.

RUBLEE, HORACE, an American editor and statesman; born in Berkshire, Vermont, August 19, 1830; went with his parents to Sheboygan County, Wisconsin, in 1846; learned the printing-business in Madison, where he went in 1848; was legislative correspondent for the Madison *Argus*, and afterward editorial writer on the *State Journal*, then a Whig organ, of which he became editor. For years he stood at the head of the Republican Party in the state; took an active part in the election of Lincoln, and successfully supported for the United States Senate T. W. Howe, who had opposed the ideas of

state rights. In 1869 he was appointed minister to Switzerland, and by his timely articles on the Alabama question in European journals received the thanks of the Secretary of State. He resigned his position as minister in 1876, and the following year was again appointed chairman of the State Central Republican Committee. He made a bold and successful stand in the succeeding campaign for sound money; in 1881 became editor of a new journal, *The Republican and News*, later consolidating with the Milwaukee *Sentinel*, and supported the candidacy of W. D. Hoard for governor. He died in Milwaukee, Oct. 19, 1896.

RUBRIC. See MISSAL, Vol. XVI, p. 510.

RUDBECK, OLOF. See SWEDEN, Vol. XXII, p. 755.

RUDIMENTARY STRUCTURES. See EM-BRYOLOGY, in these Supplements.

RUDINI, ANTONIO DI, MARQUIS, an Italian Premier; born in Palermo, Sicily, in 1839. In 1866, when only 26 years of age, he became mayor of his native city; was prefect of Palermo soon after, and held the same office in Naples in 1868. In 1869, at the age of 30, he was chosen Minister of the Interior, and later, until 1882, a deputy from Canicatti; then a deputy from Syracuse, when he formed a new Parliamentary group called the Young Right. Upon the overthrow of the Crispi Ministry, Feb. 6, 1891, Rudini was chosen Prime minister, which office he administered till May 6, 1892, when his policy for an increase in military expenses caused his retirement. He was succeeded by Crispi, who held the office till the spring of 1896, when the defeat of the Italian army by the Abyssinians and the presence of mobs in the streets of Rome caused him to resign, March 5, 1896. A new ministry was promptly formed under the Marquis di Rudini as President of the Council and Minister of the Interior. During Rudini's first premiership he reduced the expenses of African colonization, and in all his official acts sought to promote the strength, honor and dignity of Italy.

RUDLER, FREDERICK WILLIAM, an English scientist; born in London, July 8, 1840. In 1861 he was appointed assistant in the Museum of Practical Geology, and in 1870 assistant-secretary of the Ethnological Society. In 1876 he was appointed professor of natural science in the University College of Wales, but resigned in 1879 to become curator of the museum. In 1880 he presided over the anthropological department of the British association; was director of the Anthropological Institute, and editor of its *Journal*, joint editor of *Ure's Dictionary of Arts*, and with others the author of *Europe in Stanford's Compendium of Geography*, and president of the Geologists' Association (1889). He contributed to this ENCYCLOPEDIA articles on EARTHQUAKE and ELECTRO-METALLURGY, and other subjects; was a copious writer of articles for scientific journals, and a lecturer with the London Society for the Extension of University Teaching.

RUE, an herb. See HORTICULTURE, Vol. XII, p. 289.

RUFFED GROUSE (*Bonasa umbellus*), a grouse so named because of a ruff of feathers on the neck,

common in the densely-wooded districts of temperate regions of North America. It is popularly known as partridge in New England and Western states, while in the Middle states it is called pheasant. See GROUSE, Vol. XI, p. 223; and BONASA, in these Supplements.

RUFFIN, EDMUND, an American agriculturist; born in Prince George County, Virginia, Jan. 5, 1794; for many years president of the Virginia Agricultural Society. From 1833 to 1842 he edited *The Farmers' Register* and other agricultural journals. He was an active secessionist, a member of the Palmetto Guard of South Carolina, and fired the first gun at Fort Sumter, April 14, 1861. Unwilling to live under the government of the United States, he committed suicide near Danville, Virginia, June 15, 1865.

RUGBY GAME. See FOOTBALL, in these Supplements.

RUGBY SCHOOL. See RUGBY, Vol. XXI, pp. 55, 56.

RUGER, THOMAS HOWARD, an American soldier; born in Lima, New York, April 2, 1833; graduated at the United States Military Academy in 1854; studied law, and practiced in Janesville, Wisconsin, till the beginning of the Civil War. In 1861 he was appointed lieutenant-colonel of the Third Wisconsin Volunteers, and afterward colonel; promoted brigadier-general of volunteers in 1862; breveted major-general in 1864; colonel of the regular army in 1866; breveted brigadier-general in 1867 for gallantry at Gettysburg; superintendent United States Military Academy in 1871-76; brigadier-general in 1886; placed in command of the department of California in 1891, with headquarters at San Francisco, and later in command of the department of the Missouri, with headquarters at Chicago.

RUHMKORFF COIL. See ELECTRICITY, Vol. VIII, p. 103.

RULED SURFACE. See SURFACE, Vol. XXII, p. 669.

RULE NISI, a rule or order obtained in a cause pending in court upon an *ex parte* motion requiring the party against whom the rule is entered to show cause, by a certain time named in the rule, why the relief asked by the order should not be granted. After the entry of such a rule, notice must be served upon the party against whom it was entered, and the question is then heard as other motions. The rule is made absolute upon the final hearing unless good cause is shown.

RULE OF THE ROAD, at sea. See NAVIGATION, Vol. XVII, p. 277. In general. See ROAD, RULE OF, in these Supplements.

RULING-MACHINE. See GRADUATION, Vol. XI, pp. 29, 30.

RUMFORD, BENJAMIN THOMPSON. See THOMPSON, Vol. XXIII, pp. 309, 310.

RUMP PARLIAMENT. See *Pride's Purge*, under ENGLAND, Vol. VIII, pp. 347, 348.

RUMSEY, JAMES, an American inventor; born in Bohemia Manor, Maryland, about 1743; became a machinist, and made improvements in the machinery of grist-mills. In 1784 he constructed a boat for ascending streams against a current, by means of

steam acting against setting-poles, and in 1785 was granted by the Assembly of Pennsylvania exclusive right for ten years to build such boats and use them in rapid rivers. In 1787 he exhibited on the Potomac a boat propelled by forcing jets of water against the wall of water astern, for which invention he was granted a patent by the state of Virginia. He organized at Philadelphia in 1788 the Rumsey Society for the promotion of his inventions. In 1792 he went to England and navigated the Thames with a boat built on his plans, for which he obtained patents in England, France and Holland. He was the author of a *Short Treatise on the Application of Steam*. He died in London, Dec. 23, 1792.

RUNES. See SCANDINAVIAN LANGUAGE, Vol. XXI, pp. 366, 367; and ALPHABET, Vol. I, p. 612.

RUNJEET-SINGH OR RANJIT. See PUNJAB, Vol. XX, pp. 111, 112.

RUNKLE, JOHN DANIEL, an American mathematician; born in Root, New York, Oct. 11, 1822; graduated at the Lawrence Scientific School at Cambridge, Massachusetts, in 1851; while yet a student there, was appointed assistant in preparing the *Nautical Almanac* of 1849, in which work he continued till 1884. Became professor of mathematics in the Massachusetts Institute of Technology in 1865, its president from 1870 to 1878, and after 1878 Walker professor of mathematics in the same institution. The introduction of manual training in this school was due largely to his efforts. He founded and edited *The Mathematical Monthly* (1869-71) and wrote *New Tables for Determining the Values of the Co-efficients in the Perturbative Function of Planetary Motion* (1856) and *Elements of Plane and Solid Analytic Geometry* (1888).

RUNNING. See HORSE-RACING, in these Supplements.

RUNNYMEDE, a meadow in Surrey, 21 miles S.W. of London. It was the scene of the signature of Magna Charta. See JOHN, Vol. XIII, p. 714.

RUNYON, THEODORE, an American diplomat; born in Somerville, New Jersey, Oct. 25, 1822;

graduated at Yale College in 1842; admitted to the bar in 1846; city attorney in 1853 and city counselor in 1856, of Newark, New Jersey; mayor of Newark in 1864. In 1856 he revised and codified the militia laws of New Jersey, and in 1857 was made brigadier-general and afterward major-general of the New Jersey National Guard. At the beginning of the Civil



THEODORE RUNYON.

War he had command of the New Jersey Brigade of Volunteers. From 1873 to 1887 was chancellor of New Jersey. In 1893 was appointed American minister to Germany, and soon after, ambassador. Yale, Rutgers and Wesleyan Colleges conferred upon him the degree of LL.D. He died Jan. 27, 1896.

RUPEE, a coin. See MONEY, Vol. XVI, p. 733.

RUPERT'S LAND. See HUDSON'S BAY COMPANY, Vol. XII, p. 333.

RUPHIA OR ROUPHI, a river. See ALPHEUS, Vol. I, p. 615.

RUPTURE. See HERNIA, Vol. XI, p. 752.

RURIK, founder of the Russian Empire. See RUSSIA, Vol. XXI, p. 87.

RUSDEN, GEORGE WILLIAM, an Australian educator and author. In 1849 he was appointed agent for the establishment of national schools in Victoria, Australia, and afterward agent and inspector of schools in New South Wales. In 1851, when Victoria was separated from New South Wales, he was made chief clerk in the Colonial Secretary's office; clerk of the executive council in 1852; clerk of the legislative council and of the Parliaments in 1856; from 1853 to 1882 served as magistrate; for some time member of the National Educational Board in Victoria; member of the council of the University of Melbourne from its foundation till his absence in Europe caused him to resign; fellow of the Royal Geographical Society, the Royal Historical Society, the Royal Asiatic Society, etc. He wrote *National Education; Discovery, Survey and Settlement of Port Philip; Curiosities of Colonization; History of New Zealand; History of Australia* (1883); *Aurere tangā, the Great Refusal* (1890); and other works.

RUSH, JAMES, an American physician, son of the first Benjamin Rush; born in Philadelphia, Pennsylvania, March 1, 1786; graduated at Princeton in 1805, and at the medical department of the University of Pennsylvania in 1809; afterward studied in Edinburgh; practiced medicine in Philadelphia; relinquished the active duties of his profession for scientific and literary pursuits. By marrying the daughter of Thomas Ridgway he acquired a princely fortune, \$1,000,000 of which he left for the erection of the Ridgway branch of the Philadelphia Library. He wrote *Philosophy of the Human Voice* (1827); *Analysis of the Human Intellect* (1865); *Rhymes of Contrast on Wisdom and Folly* (1869). He died in Philadelphia, May 26, 1869.

RUSH, RICHARD, an American statesman; son of the first Benjamin Rush; born in Philadelphia, Pennsylvania, Aug. 29, 1780; graduated at Princeton in 1797; admitted to the bar in 1800; attorney-general of Pennsylvania in 1811, and comptroller of the United States Treasury the same year; United States Attorney-General (1814-17); minister to England (1817-25), when he negotiated the treaties regulating the North Atlantic fisheries and the northeastern boundaries; and Secretary of the Treasury (1828). In 1836 he was appointed commissioner to secure, in the English courts, the legacy of James Smithson, of over half a million dollars, which sum was made the foundation of the Smithsonian Institution at Washington, District of Columbia. From 1847 to 1851 he was United States minister at Paris, and the first minister to recognize the French Republic, acting by advice of the United States. He published *Codification of the Laws of the United States* (5 vols.); *Narrative of a Residence at the Court of St. James; Washington in Domestic Life; and Occasional Pro-*

ductions, Political, Diplomatic and Miscellaneous (1860). He died in Philadelphia, July 30, 1859.

RUSHVILLE, a village and the capital of Schuyler County, west-central Illinois, 45 miles E.N.E. of Quincy, on the Chicago, Burlington and Quincy railroad. It has wagon factories, flour-mills, brick and tile works, and a creamery. Coal is mined in the vicinity. It is in a fertile agricultural region; contains five churches, a national bank, two newspaper-offices and a high school. Population 1890, 2,031.

RUSHVILLE, a village and the capital of Rush County, central southeastern Indiana, 39 miles E.S.E. of Indianapolis and 33 miles W.S.W. of Richmond, on the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis, the Pittsburg, Cincinnati and St. Louis and the Lake Erie and Western railroads. It has manufactures of flour, lumber and furniture, and has a large trade in grain, live-stock and lumber. Rushville has the most extensive blooded-horse market in the state. Population 1890, 3,475.

RUSK, a town and the capital of Cherokee County, central eastern Texas, 108 miles E. of Waco, on the St. Louis South-Western and the Texas State railroads, in an agricultural and iron-mining region. Lumber, cotton and hides are produced in the district. It is the seat of the Eastern Texas Penitentiary, whose inmates are employed in the manufacture of articles made of iron. Rusk has the state smelting-works. Population 1890, 1,383.

RUSK, JEREMIAH McLAIN, an American soldier and statesman; born in Morgan County, Ohio, June 17, 1830. He was brought up on a farm; removed to Wisconsin in 1853 and engaged in farming; major of the Twenty-fifth Wisconsin Infantry in 1862, and served throughout the Civil War; brevetted brigadier-general in 1865; bank comptroller of Wisconsin from 1866 to 1870; member of Congress from 1871 to 1877; governor of Wisconsin from 1882 to 1889; in 1889 appointed, by President Harrison, Secretary of the Department of Agriculture (previously Bureau of Agriculture). Died in Viroqua, Wisconsin, Nov. 21, 1893.



JEREMIAH M. RUSK.

RUSK, THOMAS JEFFERSON, an American public man; born in Camden, South Carolina, Aug. 8, 1802. He practiced law in Georgia, and in 1835 removed to Texas, where he joined the movement for the annexation of Texas to the United States. In 1836 he was a member of the convention which declared Texas independent of Mexico, and became the first Texan Secretary of War. After General Houston was wounded in the battle of San Jacinto, Rusk became commander of the army, and held this position till the constitutional government of Texas was organized, in October, 1836. From 1838 to 1842 he was chief justice of Texas. He was president of the convention that consummated the annexation of

Texas in 1845. After that he was United States Senator for ten years. He died in Nacogdoches, Texas, July 29, 1856.

RUSKIN, JOHN, an English art critic and prose-writer, was born in London, Feb. 8, 1819. He was educated privately, as his autobiographical reminiscences in *Praterita* inform us, till he passed to Christ Church, Oxford, where he won the Newdigate prize for verse in 1839, and graduated in 1842. His taste for art was early manifested, and, after graduating, he studied painting under Harding and Copley Fielding, but his masters, as he tells us,



JOHN RUSKIN.

were Rubens and Rembrandt. At the outset of his career he was led to take up a defense of J. W. M. Turner (q.v., Vol. XXIII, pp. 68) and the contemporary school of English landscape-painting against the foreign trammels which had fastened themselves upon modern art, and especially to prove the superiority of modern landscape-painters over the Old Masters. This revolutionary opinion, though at first it was hotly combated, established the new critic's position as a writer on art, and the defense grew into the famous work called *Modern Painters* (5 vols., 1843-60). This elaborate work deals with general æsthetic principles, and, with a charm that is irresistible, presents us with its author's ideas of beauty, and enshrines word-poems on mountain, leaf, cloud and sea which, it is not too much to say, will live forever in English literature. In the second volume Mr. Ruskin takes up the Italian painters, and discusses at length the merits of their respective schools. From the study of painting, Mr. Ruskin passed for a time to that of architecture. In this department we have, from his pen, *The Seven Lamps of Architecture* (1849) and *The Stones of Venice* (1851-53). Then followed lectures on drawing, perspective, decoration and manufacture, with later crochets and theories on political economy, pre-Raphaelitism, etc., with a flood of opinions on social, ethical and art subjects, enriched by rare intellectual gifts and religious fervor. His whole writings form a body of literature unique of its kind, pervaded with a charm of literary style, and inspired by a high moral purpose. Mr. Ruskin's excursions into non-æsthetic fields, and the strange jumble of Christian communism to which, late in life, he gave vehement expression, have detracted much from his early fame. In everything he wrote, the Ruskinian spirit comes strongly out, colored with an amiable egotism, and enforced by great assurance of conviction. The moral purpose he had in view, and the charm and elevated tone of his writings, lead us to forget the wholly ideal state of society he sought to introduce, and we are won to the man by the passion of his noble enthusiasms. With the advent of the pre-Raphaelite school, Mr. Ruskin warmly espoused its art-principles in a series of letters to the London *Times* in 1851, and

in a number of lectures, since gathered into his *Collected Works*, in 26 volumes. The following are some of his varied lectures and treatises on æsthetic subjects: *Lectures on Architecture and Painting* (1854); *The Two Paths* (1854), dealing with art in its application to decoration and manufacture; *Elements of Drawing* (1857); *Elements of Perspective* (1859); *Ariadne Florentina* (1873), a monograph on Italian wood and metal engraving; and *Aratra Pentelici* (1872), on the principles of sculpture. Besides these, he published, at various times, a number of instructive and inspiring lay sermons on the mystical union between nature and art, beauty and utility, and their reflex in the reverential homage for the beautiful and the worthy in the mind and character of the race. In this latter service he has produced a great body of fine and thoughtful work, which is as enchaining as its meaning is often profound. The best known of these lay sermons are *The Crown of Wild Olive*, essays on work, traffic and war; *Sesame and Lilies*, essays, especially for girls, on improving literature; *Ethics of the Dust*, in which nature's crystallization is a foil for a diatribe against sordid living; *The Queen of the Air*, a splendid blending of his fancy with the Greek myths of cloud and storm; *The King of the Golden River*, a fairy story; *The Eagle's Nest*, on the relation of natural science to art; *Proserpina*, in which flowers were what storm and cloud were for *The Queen of the Air*; *Love's Meinie*, on birds; and *Deucalion*, on geology. His other writings embrace four volumes, entitled *Fors Clavigera* (1871-74), lectures to English workmen and laborers; *Val d'Arno*, on thirteenth-century art in Pisa and Florence; *Pleasures of England*, on English modern art and history; *Time and Tide*, letters to a workingman; *Mornings in Florence*, Christian art-studies for travelers; *St. Mark's Rest*, on Venetian history; *Munera Pulveris* and *Unto This Last*, two treatises on political economy, with a volume of *Lectures on the Political Economy of Art* (1858). He has also published a monograph on *Giotto and His Works in Padua* (1854); two volumes of his letters, entitled *Arrows of the Chase* (1880); *Hortus Inclusus*, letters to women; *Notes on the Construction of Sheepfolds* (churches); a work on the *Poetry of Architecture*; a collection of his early *Poems*, and *Praterita*, previously mentioned, unfinished installments of an autobiography. In addition to this varied work for art, Mr. Ruskin has held a lectureship at Cambridge, and a professorship of fine art at Oxford, which he once left because of his opposition to vivisection at the university, and he founded St. George's Guild at Oxford for inculcating in young and old the gospel of manual labor, opposed to all modern mechanical and manufacturing processes, with the old-time virtues of purity, manliness and courage. In all these labors and aims Mr. Ruskin set before himself a high, if somewhat Quixotic, ideal of life, and with great earnestness did much, not only for the elevation of his fellow-men, but for the development of sound artistic taste and the enriching and spiritualizing of life by seeking to surround it at all times with the true and the beautiful. In 1873 Mr. Ruskin became his own publisher, and found it remunerative, as well as more

satisfactory to his fastidious taste in books. In old age ill health arrested his productiveness. The best account of him is by his secretary, W. G. Collingwood, and it appeared in 1893.

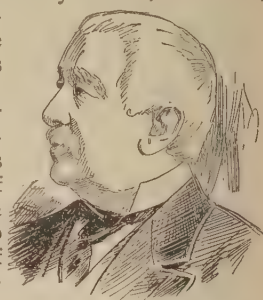
G. MERCER ADAM.

RUSSELL, HENRY CHAMBERLAINE, a British astronomer; government astronomer of New South Wales, Australia, since 1863; fellow of the Senate of the University of Sydney, and vice-president of the Board of Technical Education, New South Wales. Under his direction, parties were sent out in 1874 and 1882 to observe the transit of Venus, and in 1881 that of Mercury. He presided over the first Australian Meteorological Conference in 1879. He wrote seventy-five or more reports and original papers upon astronomical and meteorological matters, which were published by the New South Wales government, by the Royal Astronomical Society of London, and by the Royal Society of New South Wales.

RUSSELL, WILLIAM CLARK, an English novelist; born in New York, Feb. 24, 1844, of English parentage, being the son of Henry Russell, author of *Cheer, Boys, Cheer*. He was educated at Winchester and in France; went to sea at the age of 13, as a midshipman, and made several voyages to Australia, India and China. He abandoned a naval career in 1865; wrote a few novels under a *nom-de-plume*, and contributed to London periodicals. In 1874 he achieved his first literary success in *John Holdsworth, Chief Mate*. The warm welcome given to this book led him to draw further on his nautical experiences. It was followed by *The Wreck of the Grosvenor*, the most popular of his stories (1878); *A Sailor's Sweetheart* (1880); *An Ocean Free Lance* (1881); *The Lady Maud* (1882); *A Sea Queen* (1883); *The Death Ship* (1888); *What Cheer*; etc. He joined the staff of the London *Daily Telegraph*, and contributed stories and leading articles to that journal, at the same time writing novels. His connection with the *Daily Telegraph* ceased in 1887, but the greater part of his contributions to that paper, which cover a wide range of seafaring interests, have been published in book-form.

RUSSELL, WILLIAM EUSTIS, an American lawyer; born in Cambridge, Massachusetts, Jan. 6, 1857; graduated at Harvard in 1877, and at the Boston University Law School. He was in the service of his native city as member of the common council one year, alderman two years, and mayor four years. He was nominated by the Democrats for governor of the state, first in 1888, and again in 1889, when he was elected; he was again elected in 1891 and 1892. At the end of his third term he resumed the practice of law. He was a delegate to the Democratic national convention at Chicago in 1896, and worked against the adoption of a silver-standard platform. He died at a fishing-camp near Little Pabos, Quebec, July 16, 1896. He was recognized as a leading lawyer, and his law firm was one of the most prominent and prosperous in Massachusetts. He was a contributor to the leading journals upon public questions, his last article appearing in the *Forum* the month of his untimely death.

RUSSELL, SIR WILLIAM HOWARD, an Irish journalist; born in Lilyvale, County Dublin, March 28, 1821; entered Trinity College in 1838; entered the Middle Temple, and was called to the bar in 1850. On the declaration of war with Russia he was dispatched to the Crimea as special correspondent of the *Times*, through which journal he made known to the public the sufferings of the army in winter quarters. The account aroused such indignation that the ministry was succeeded by a government pledged to military reform. In 1857, on the outbreak of the Mutiny in India, he was again war correspondent for the *Times*. In 1861, at the beginning of the Civil War, he proceeded to Washington as correspondent of the same paper, and joined McDowell's army on the day of the first battle of Bull Run. His account of the rout of the Federal army was greatly censured in the United States, and gained for him the sobriquet of "Bull Run Russell." He was correspondent during the war between Prussia and Austria in 1866, between France and Germany in 1870, and was with Lord Wolseley in the Zulu troubles and in Egypt. Mr. Russell published numerous works, as *Letters from Crimea*; *Diary in India*; *My Diary North and South*; etc. He was a knight of the Iron Cross, commander of the Legion of Honor, and had Indian, Turkish and other war medals. He was knighted in 1895.



SIR W. HOWARD RUSSELL.

RUSSELL OF KILLOWEN (CHARLES RUSSELL), LORD, an English jurist; born on the outskirts of Newry, County Down, Ireland, in 1833. He came of an old Roman Catholic family, and was the only one of five children who did not enter the service of the Catholic Church. Commencing life in the office of an attorney at Newry, he turned toward the bar in 1851 and moved to London as offering greater possibilities of success. Here he supported himself at first by reporting in the press gallery of the House of Commons. In 1859 he was called to the bar at Lincoln's Inn and speedily became prominent as an advocate. He was appointed a queen's counsel in 1872, having established himself as one of the leaders of the English bar. In 1880, after two unsuccessful attempts, he entered Parliament and became, in turn, Solicitor-General and Attorney-General. A man of strong political convictions, he was an earnest follower of W. E. Gladstone and a warm advocate of Home Rule. He devoted little of his time to St. Stephen's or its politics, confessing,



LORD RUSSELL.

somewhat sadly, that "common law admitted of no bedfellow."

As an advocate, his fame was more than national, and few were the great trials in which he was not retained. Some one once said of him that he was the only man at the bar who could speak in italics. His voice, if it had not the exquisite silvery cadence of Lord Coleridge's, was clear, persuasive and resonant. The words were always aided by energetic action, and by the deep, gleaming eyes of the speaker. He could bring a special technical knowledge to bear upon almost any case submitted to him. It has been well said that no one but Lord Russell could have delivered that famous speech before the Parnell Commission of 1880. The skill with which he could play upon the emotions of a jury made him much sought after in society scandal suits. He was concerned as an advocate in the Colin Campbell divorce case, the Crawford divorce case, the Tranby Croft bacarat scandal, wherein the Prince of Wales was called as a witness, and defended Mrs. Maybrick for murder. While Attorney-General under the Gladstone administration of 1886, he was knighted. On the decease of Lord Bowen in 1894, he was appointed a Lord of Appeal in Ordinary, with a life peerage, and in July of the same year, Lord Chief Justice of England, in succession to Lord Coleridge.

In 1896 he visited the United States in company with Sir Frank Lockwood and other English jurists, and delivered an address on "International Arbitration" before the annual meeting of the Bar Association of America, held in Saratoga Springs, New York. He presided over the trial of Dr. Leander Starr Jameson and his fellow raiders for invading the Transvaal, and at a single sweep brushed away every legal technicality and cobweb of old-time law from the Foreign Enlistment Act of 1870.

RUSSELLVILLE, a town of Pope County, central northwestern Arkansas, 60 miles N.W. of Little Rock, on the Dardanelle and Russellville and the St. Louis, Iron Mountain and Southern railroads. It contains grist, saw and cotton mills, a national and a state bank and a weekly periodical; has also wagon and plow factories. Population 1890, 1,321.

RUSSELLVILLE, a town and the capital of Logan County, southwestern Kentucky, 47 miles N. of Nashville, on the Louisville and Nashville railroad, has a flour-mill, tannery, wagon, plow and tobacco factories. It is the seat of Bethel College (Baptist), an institution established in 1854, and had, in 1896, 7 instructors, 213 pupils and a library containing 1,000 volumes. The town has, besides, Logan College for Women (Methodist). Population 1890, 2,253.

RUSSIAN EMPIRE. For general article on RUSSIA AND THE RUSSIAN EMPIRE, see RUSSIA, Vol. XXI, pp. 67-110.

Recent History. Five events of importance have marked the history of Russia in recent years. The Pamir difficulty (see AFGHANISTAN) may be dismissed with a brief reference, as that question, which at one time threatened the disruption of diplomatic relations between Great Britain and Russia, was ami-

cably adjusted. The dreadful famine, which afflicted not less than 18 Russian provincial governments and some 36,000,000 of the subjects of the Czar, was systematically fought, but it may be years before the peasantry of the stricken provinces will regain their former degree of prosperity. It was known as early as June, 1891, that the crops in the districts of Perm, Astrakhan, Kostroma, Orel, Kursk, Kherson and Kharkof would be very meager, and that the agricultural outlook in the districts of Viatka, Nijni-Novgorod, Kasan, Simbirsk, Samara, Orenburg, Riazan, Penza, Saratov and Toula was of the blackest. This catastrophe was precipitated by a dreadful drouth, when, for five months, not a drop of rain fell in the afflicted districts. Blasting winds swept over the fields, blighting all grain.

The winter of 1890-91 was one of little snow, and the unprotected frozen soil drank less than the usual moisture from that source. A species of prairie-rat, called *ruks*, appeared and ravaged many provinces, while blight-clouds—myriads of insects darkening the skies—hovered over the land, and wherever they rested they left a desert. To aggravate the difficulties of the position in which the Russian government found itself, it was discovered that astute grain dealers, early in the season anticipating a dearth, had been industriously engaged in exporting grain from the country. There were not ships enough to carry the grain which they hurried out of Russia. America marveled at Russia's enormous output of grain, and imagined it was the natural consequence of an unusually good crop. The Russian factor knew better, and foresaw the inevitable end. He realized perfectly that the tremendous amounts of grain going out came not from the stores of surplus, but from the very food necessary to keep the peasant from starvation. The imperial ukase which was issued forbidding the exportation of wheat, oats and rye came too late, and in fact only aggravated the situation by forcing up the price of what little grain remained in the country. Cold weather then arrived, and a black and bitter winter set in, amid intense suffering among the peasants. The government threw itself into the breach and did its best to fight the famine, and it was nobly seconded by many of the great land-owners. Substantial aid was sent from America to the amount of about seven hundred and fifty thousand dollars. Seventy-five million dollars were given by the government to support the starving peasantry until the arrival of a new crop, and the Czar himself contributed to the relief fund four million dollars. Pestilence, however, arrived to add to the horrors of the situation. Typhus and "hunger fever" spread rapidly, and the scourge of cholera made its way up the Volga Valley to Nijni-Novgorod, Moscow, St. Petersburg and the Baltic. A careful estimate of the cost of the famine to Russia, during the two years most affected, places the figures at two hundred million dollars.

The enforced exodus of Jews from Russia, during the closing years of the reign of Alexander III, drew down upon the government the criticism of the press of civilized countries. In 1892, hundreds of them were expelled from the empire, and thousands more forced within certain restricted limits.

But there were still, in 1895, 3,000,000 Jews in the empire.

A prodigious Russian enterprise is the Trans-Siberian railway, which, when it is completed, is expected to cause an enormous commerce to flow through Vladivostok and San Francisco. This line will be 4,950 miles long. It was begun in 1892 and is being pushed rapidly.

Emperor Alexander III died Nov. 1, 1894, after a few months' illness, and his eldest son, a young man of 27, at once ascended the throne as Emperor Nicholas II, and 26 days later married Princess Alix of Hesse. In celebration of this latter event the new Czar pardoned 20,000 state prisoners, and his subjects ventured to hope that his reign would be milder and more humane than that of his predecessors. He and the Czarina were crowned with most imposing ceremonies inside the Kremlin, in Moscow, July, 1896. A terrible catastrophe that caused the death of over 3,000 peasants in an unexplained crush and panic damped the enthusiasm of the assembled throngs. Shortly after the coronation it was authoritatively stated that an offensive and defensive alliance existed between Russia and France to counterbalance the power of the Triple Alliance. For Nicholas II, see NICHOLAS II, in these Supplements.

Population in 1893. The total population of the empire numbered, in 1893, 118,354,649. The population in cities of over 100,000 inhabitants reached the following figures: St. Petersburg, 1,035,439; Moscow, 822,397; Warsaw, 532,260; Odessa, 332,690; Kharkoff, 196,200; Kieff, 193,151; Riga, 181,935; Lodz, 149,839; Kazan, 137,988; Saratuff 123,230; Kishineff, 122,917; Vilna, 109,363; Astrakhan, 104,856; and Samara, 100,263.

According to a recent partial census, the Hebrews number 2,843,364 in the western and southwestern provinces of Russia (2,261,863 in towns), that is, 11.3 per cent of the aggregate population; 77,275 in the three townships of Odessa (73,389, i.e., 35.1 per cent of population), Kertch and Sebastopol; and 431,800 in 5 governments only of Poland out of 10 (11 per cent of population). Their aggregate number in Russia would thus exceed 3,500,000.

The Russian Budget for 1893 showed the revenue for that year was \$521,328,000, and the expenditures \$529,266,386.

Public Debt. All the liabilities of the empire, inclusive of the debt for the redemption of land, are reckoned as follows, in paper money (roubles argent*), on Jan. 1, 1895:

State debt, inclusive of the paper currency (568,513,456 roubles) and 50,000,000 roubles to the bank of the state.....3,594,731,133
Railway obligations.....1,465,379,243
Redemption of land.....465,129,650

Total debt.....5,525,240,026

The Russian Army has been entirely reorganized since the Turkish War. Since the modification of the laws, June 26, 1888, the service has been organized as follows:

* One rouble gold = 80 cents. The rouble *argent*, or *credit*, fluctuates in value; its value has been lately about 55 cents. This fluctuation is not due to the fluctuation in the market value of silver, as it is represented by paper money only, which the Russian government does not accept at its treasury for more than 55 cents.

Out of more than 950,000 young men reaching their majority every year, about 250,000 are taken into the active army, and the remainder are inscribed partly in the reserve and partly in the second reserve, or "Zapas." The period of service is, in European Russia, 5 years in the active army (in reality reduced by furloughs to 4 years), 13 years in the reserve and 5 years in the "Zapas"; 7 years in the active army and 6 years in the reserve, in the Asiatic dominions; and 3 years in the active army and 15 years in the reserve, in Caucasia. In case of need, the Minister of War has the right of keeping the men for another six months under the colors. Clergymen are exempt, as also doctors and teachers.

In 1894, out of the 953,679 young men liable to military service, 29,668 (6,239 Hebrews) did not appear; 152,954 were found too weak for military service; 217,865 inscribed in the second reserve as being single workers in their families; and 268,351 were taken into the army, besides 2,400 Caucasian natives, out of 23,960 liable to service. The men inscribed in the reserve troops are convoked for drill six weeks twice a year.

The "Zapas," formerly a simple militia, was reorganized in 1888, and the duration of the service prolonged to 43 years instead of 40. It is divided into two parts. The first part includes all those who have passed through active service, and those who have not been taken into the active army, though able-bodied. The second part (including all able-bodied men who have served in the first division, as also those liberated from service as not fully able-bodied, or being single workers in their families) can be called out only by an imperial manifesto.

Reliable figures representing the total of the Russian army on a war footing may be set down as follows:

	OFFICERS.	OFFICIALS.	MEN.		HORSES.	GUNS.
			COMBATANTS.	NON-COMBATANTS.		
Russia in Europe	36,778	4,387	1,770,206	85,476	343,488	3,380
Caucasia	5,318	728	248,342	15,196	68,411	300
Transcaspian ..	441	66	20,257	1,054	4,573	30
Turkestan and						
Omsk	1,367	180	69,444	4,545	19,712	108
Irkutsk and						
Amur	849	127	41,415	2,220	7,718	58
Total	44,733	5,488	2,149,664	108,491	443,902	3,876

Navy. The imperial navy, on Jan. 1, 1895, comprised 123 armored steel vessels, including those built or provided for, of which 10 were battle-ships; 23 port-defense vessels, 43 cruisers, and 47 torpedo-craft. There are, besides, 100 small vedette torpedo-craft on the Baltic Sea. This navy was commanded by a general admiral, the commander-in-chief, 9 admirals, 18 vice-admirals, 25 rear-admirals, 77 captains, 603 lieutenants, and 317 midshipmen, besides 284 officers in the engineering department, and was manned by 30,000 sailors. The sailors are recruited in the same manner as the soldiers of the

Russian army, and serve ten years,—seven in active service and three in the reserve.

The volunteer fleet, destined for commerce and transport of exiles to Sakhalin in time of peace, and for war purposes in time of war, numbers ten cruisers.

The Seagoing Commercial Navy (including vessels of 100 tons and upwards) of Russia consisted, in the year 1890, of 236 steamers, of 156,070 gross tons, and 945 sailing-vessels, of 271,265 net tons. About one fourth of the vessels were engaged in trading to foreign countries, and the remainder were coasting vessels, many of them belonging to Greeks sailing under the Russian flag.

The chief Russian fair is that of Nijni-Novgorod. In 1890 the goods shipped to the fair were valued at \$99,691,256, as against \$106,354,140 in 1888. Of that there remained unsold goods to the value of \$3,871,912 (\$7,653,047 in 1888).

Land Transfers. The state of the redemption operation of the land allotted to the liberated serfs is seen from the following accounts up till Jan. 1, 1892:

RUSSIA.

Number of male peasants who redeemed the land with state help	6,666,531
Number of acres redeemed	62,353,600
Value of the land in roubles	713,570,805
Average price of the allotment.....107 roubles, 40 kopecks	
Average size of allotment, in acres.....9.4	
Average price of the acre.....11 roubles, 70 kopecks	
Average former debt of the landowner to the state mortgage bank, per allotment	57 roubles, 14 kopecks
Average sum paid to the landlord, per allotment	69 roubles, 90 kopecks

Moreover, 84,473 leaseholders redeemed their allotments (1,734,076 acres) for the sum of \$11,030,612, in South Russia and the Western Provinces, according to the laws of 1888, which recognize private ownership of land.

Mining. The official returns for mining given below are for 1892. The following products for the year were: Gold, 42,996 kilograms; platinum, 4,357 kilograms; silver, 13,776 kilograms; lead, 825 tons; copper, 4,199 tons; pig-iron, 995,000 tons; iron, 319,000 tons; steel, 279,000 tons; coal, 6,800,000 tons; naphtha, 4,490,000 tons; salt, 1,405,000 tons.

Industry. The number of all kinds of manufactories, mines and industrial establishments in European Russia (without Poland and Finland) was 62,801 in 1885, employing 994,787 work-people, and producing a value of \$562,072,148. The 20,381 manufactories of Poland employed 139,650 workmen, and produced a value of \$102,202,210. The Caucasus had, in 1884, 14,244 manufactories, mostly small, with 43,502 workmen, producing a value of \$19,117,450, chiefly in silk; while the 6,496 manufactories of Finland yielded \$9,210,784. In European Russia only 545 manufactories have a yearly production above \$275,000, and 2,417 above \$55,000.

The cotton industry is rapidly developing, as also that of wool, in southern Russia.

Of the people employed in 1892, there were 19,033 boys, 8,311 girls, 184,144 women, and 577,834 men. Besides, the small manufactories having

a yearly production of less than \$550 numbered in 1887, 54,486, with 91,681 people employed.

Exports and Imports. The chief trade of the empire is carried on through its European frontier, as seen from the following table. But the European frontier does not include the Caucasus, so that the rapidly increasing exports of grain, and especially of naphtha, from the ports of the Caucasus appear in the exports from the Asiatic frontier, although both are exported to Europe. On the other side, the arrivals of tea from China to Odessa or St. Petersburg appear in the imports to the European frontier.

EXPORTS.	1892.
Through European frontier	\$400,455,000
Through Asiatic frontier.....	25,575,000
Trade with Finland.....	10,615,000
Total	\$436,645,000
IMPORTS.	
From European frontier	\$182,765,000
From Asiatic frontier.....	25,850,000
Trade with Finland.....	6,270,000
Total	\$214,885,000

If the trade of northern Caucasia via the Black Sea be added to the above figures for 1892 by the European frontier, the exports would be \$417,063,640, and the imports \$183,361,238.

RUSSIA LEATHER. See LEATHER, Vol. XIV, p. 388.

RUSSIAN LANGUAGE. See SLAVS, Vol. XXII, pp. 148, 149.

RUSSIAN LITERATURE. See RUSSIA, Vol. XXI, pp. 102-110.

RUSSO-TURKISH WAR. See TURKEY, Vol. XXIII, pp. 651, 652.

RUSTAM. See PERSIA, Vol. XVIII, pp. 633, 656.

RUSTS, a common name given to various parasitic fungi, notably those of the order *Uredineæ*, which give a rusty appearance to the plants which they infest. Probably the best known is the wheat-rust, whose life-history is very complex. In different phases of its life-history it lives upon different hosts, or none at all. Normally appearing upon the leaves of the barberry, it produces spores which germinate later in connection with wheat, producing the common red rust; while later, on the wheat (upon the stubble if the wheat is cut), there appear other spores, known as the black rust. The black rust spores give rise to still another phase of the plant, which does not live parasitically, and the spores of this, in turn, give rise to the form on the barberry. There are numerous forms of rusts infesting many plants, all with a more or less complex life-cycle.

RUTABAGA, the name given to a variety of turnip, otherwise known as the Swedish turnip, which differs from the ordinary form in having longer and yellowish roots. All the forms of turnip seem to have been derived from *Brassica campestris* of the Old World, a genus which also contains the mustards and cabbages.

RUTACEÆ, a large and widely varied family of shrubs chiefly, with transparent dots or glands upon the leaves, most largely displayed in the tropics.

Here belong the common rue (*Ruta Graveolens*), the prickly ash (*Zanthoxylum*) of America, the hop-tree (*Ptelea*), and the numerous forms of orange, lemon, citron, etc., of the genus *Citrus*.

RUTEBŒUF. See FRANCE, Vol. IX, p. 648.

RUTHENIANS. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 631.

RUTHENIUM. See CHEMISTRY, Vol. V, pp. 536, 537.

RUTGERS, HENRY, an American soldier and philanthropist; born in New York City, Oct. 7, 1745; graduated at Columbia College in 1766; served as captain, and later as colonel, in the Revolutionary War; became a wealthy citizen of New York; was an active politician, and a member of the Reformed Dutch Church; several times elected to the New York legislature, and served as a regent of the University of New York from 1802 to 1826; gave \$5,000 to Queen's College, New Jersey, which adopted the name, Rutgers College, in 1825. He died in New York, Feb. 17, 1830.

RUTGERS COLLEGE, an institution at New Brunswick, New Jersey, chartered in 1766 as Queen's



MAIN BUILDING, RUTGERS COLLEGE.

College, primarily for the education of candidates for the ministry of the Reformed Dutch Church, of which, by the charter, the president is required to be a communicant. The early history of the college was marked by constant struggles, and for a time its exercises were suspended, but in 1825, after receiving a benefaction from Henry Rutgers of New York, it was reopened under its present name. In 1863 a scientific department, under the name of Rutgers Scientific School, was organized. In 1896 there were 28 instructors, 180 students, and 31,000 volumes in the library.

RUTHERFORD, a borough of Bergen County, northeastern New Jersey, 21 miles E. of Morriston, on the New York, Lake Erie and Western railroad. It is an attractive residence place, and has been built up almost entirely by New York business men. Population 1890, 2,293.

RUTHERFORD COLLEGE, the seat of Rutherford College, in northwestern North Carolina. It is a co-educational, non-sectarian institution, organized in 1853, and having, in 1895, 6 instructors, 159 students, and a library containing 5,000 volumes.

RUTHERFORDTON, a village and the capital of Rutherford County, western North Carolina, 30 miles S.S.W. of Morgantown, on the Ohio River, and on the Charleston and the Seaboard Air Line railroads; has large factories of leather and harness, four churches and a courthouse. Population 1890, 479.

RUTHERFURD, LEWIS MORRIS, an American astronomer; born in Morrisania, New York, Nov. 25, 1816; graduated at Williams College in 1834, and studied law with William H. Seward; practiced law with Hamilton Fish in New York City, but soon abandoned it and devoted his time to scientific studies, more particularly in the direction of astronomical photography. Mr. Rutherford invented and constructed a number of instruments which have proved of great value to astronomers. He constructed a micrometer for the measurement of astronomical photographs, for use upon pictures of solar eclipses or transits, and upon groups of stars, of which he measured several hundred, showing, as he claimed, that the photographic method is at least equal in accuracy to that of the heliometer or filar-micrometer, and far more convenient. His photographs of the moon are among the very best that have yet been obtained. (See ASTRONOMY, Vol. II, p. 702.) In 1870 he constructed a ruling-engine, which produced interference-gratings on glass and speculum metal that were superior to all others until a recent invention by Professor Henry A. Rowland. Mr. Rutherford was one of the original members named in the act of Congress in 1863 creating the National Academy of Science, and in 1887 was appointed, by the President, as its representative to the international conference in Paris, but was obliged to decline on account of ill health. He was for years a trustee of Columbia College, resigning in 1874, but donated his instruments to that institution, where they are now mounted. He died at Tranquillity, New Jersey, May 30, 1892.

RUTILE. See TITANIUM, Vol. XXIII, p. 410.

RÜTIMEYER, LUDWIG, a Swiss zoölogist; born in Biglen in 1825; studied theology at Bern, medicine and natural science at Paris under Beaumont, at London under Owen, and at Leyden; was appointed professor of comparative anatomy and zoölogy at Basel, in 1855. He made valuable investigations in the lake-dwellings of Switzerland. (See ETHNOGRAPHY, Vol. VIII, p. 617.) Among his works, the most important of which refer to geology and palæontology, are *Untersuchungen der Thierreste aus den Pfahlbauten in der Schweiz* (1860); *Die Fauna der Pfahlbauten in der Schweiz* (1861); *Beiträge zur Kenntniss der fossilen Pferde* (1863); *Versuch einer natürlichen Geschichte des Rindes in seinen Beziehungen zu den Wiederkäuern im all gemeinen* (1866-67); *Beiträge zu einer natürlichen Geschichte der Hirsche* (1880-84); and, in connection with Wilhelm His, *Crania Helvetica* (1864).

RUTLAND, a city of Vermont. The railroads entering the city are the Central Vermont, the Bennington and Rutland and the Delaware and Hudson. The city has a fine water-supply, gas and electric light plants, 7 churches, 6 public schools and a high school, a classical institute, a military institute, 2 libraries, 2 convents, a United States

government building, one of the state penitentiaries, a house of correction, 5 national and 2 savings banks, and 2 trust companies. There are manufacturing of dairy and cheese factory apparatus, machinery, sugar-evaporators, shirts, scales, sewer-pipe, engines and boilers, doors, sashes and blinds, monumental and cemetery work, and onyx decorative works. Population 1890, 11,760. See also RUTLAND, Vol. XXI, p. 114.

RUTLAND (JOHN JAMES ROBERT MANNERS,) DUKE OF, (the seventh of the title), born at Belvoir Castle, Leicestershire, Dec. 13, 1818; educated at Eton, and Trinity College, Cambridge; was returned as a Conservative member of Parliament from Newark in 1841; was defeated in a contest for Liverpool in 1847, and for London in 1849, but was returned for Colchester in 1850, and represented that borough until 1857, when he was elected for North Leicestershire. While in Parliament he opposed the repeal of the Corn Laws; advocated cultivation of diplomatic relations with the Pope, a relaxation of the law of mortmain, the passing of the Ten Hours Factory Act; opposed Sir Robert Peel's free import measure in 1845-46, and from that time identified himself completely with the Conservatives; was First Commissioner of the Office of Works in all three of Lord Derby's cabinets; on the return of the Conservatives to power in 1874, was appointed Postmaster-General, holding the office until the Conservatives went out of power in 1880; was returned to Parliament for the then newly created Melton division of Leicestershire, and was appointed Postmaster-General in Lord Salisbury's government. He was appointed Chancellor of the Duchy of Lancaster in 1886, and on the death of his elder brother succeeded to the dukedom of Rutland in 1888.

RUTLEDGE, EDWARD, a signer of the American Declaration of Independence; born in Charleston, South Carolina, Nov. 23, 1749. He studied law at the Temple, London, and practiced at Charleston. He was chosen to the first Continental Congress, and in 1776 was a member of the board of war. When the British began hostile operations in South Carolina, Rutledge commanded a company of artillery. But in 1780 he was captured at Charleston and remained a prisoner for a year. After his exchange he resided at Philadelphia. When the British withdrew from Charleston in 1782, he returned home and served in the legislature. In 1798 he was elected governor of South Carolina, but, before the expiration of his term, died, Jan. 23, 1800.—His brother, JOHN RUTLEDGE, an American jurist; born in Charleston, South Carolina, in 1739. After studying law at the Temple, London, he began its practice at Charleston in 1761. In 1765 he was a leading member of the Stamp-Act Congress in New York, and in 1774 of the first Continental Congress in Philadelphia. Patrick Henry pronounced him "by far the greatest orator" in that assembly. He was chairman of the committee that framed a constitution for South Carolina in 1776, and became the first governor of that state. In 1784 he was made state chancellor. He was a member of the convention which framed the Federal Constitution, and of the state convention which ratified it. On July 1, 1795, he was ap-

pointed chief justice of the United States supreme court. He presided at the August term. But when the Senate met in December his mind had failed, and the Senate did not confirm his appointment. He died in Charleston, July 23, 1800.

RUTULI. See *ÆNEAS*, Vol. I, p. 182; and also *LATIIUM*, Vol. XIV, pp. 343, 344.

RUVO DI PUGLIA, a town in the province of Bari, southeastern Italy, 22 miles W. of Bari. It is celebrated for the great number of beautiful antique vases found in the necropolis. Population, 17,956.

RYAN, PATRICK JOHN, an American Roman Catholic archbishop; born in Cloneyharp, Ireland, Feb. 20, 1831; educated at Thurles and Dublin; prepared for the American mission at Carlow College; was ordained deacon in 1853, and the same year removed to St. Louis, Missouri, where he completed his ecclesiastical studies in Carondelet Seminary; became a priest in 1854; vicar-general and coadjutor archbishop of St. Louis, with the title of bishop of Tricomia. In the latter position almost the entire government of the diocese rested upon him, owing to the great age of Archbishop Kenrick. His administration was marked by energy and success, and in 1884 he was nominated and received the pallium as archbishop of Philadelphia. Bishop Ryan was selected, in 1883, to represent the interests of the Roman Catholics of the United States, and in 1884 made the opening address at the third plenary council of Baltimore. He went to Rome in 1887 in the interests of a Catholic university at Washington.



ARCHBISHOP RYAN.

RYAN, STEPHEN VINCENT, an American Roman Catholic bishop; born near Almonte, Upper Canada, Jan. 1, 1825; was taken while a child to Pottsville, Pennsylvania, and in 1840 entered St. Charles Seminary, in Philadelphia; became a member of the Lazarist Order in 1844; studied theology in the Seminary of St. Mary's of the Barrens, Missouri, and in 1849 was ordained a priest at St. Louis. He held professorships at St. Mary's and Cape Girardeau colleges, becoming prefect of the latter in 1851 and president in 1857; was appointed head of the Lazarist Order in the United States in 1857; removed to Germantown, Pennsylvania, where he was instrumental in founding the novitiate and mother-house of his order; was appointed bishop of Buffalo in 1868, and immediately called to a council at Rome, being present during the bombardment of the city by Garibaldi. He died in Buffalo, New York, April 10, 1896.

RYDBERG, ABRAHAM VICTOR, a Swedish author; born in Jönköping, Smaland, Dec. 18, 1829; educated at Vexjö and the University of Lund. He became literary editor of a daily paper at Gothenburg in 1855. In 1870 he was elected to the Swedish Parliament from Gothenburg; in 1876 inaugu-

rated the annual philosophical and historical conferences; in 1877 was elected to the Swedish Academy, and in 1882 was named professor of the history of civilization by the New Academy of Stockholm. Rydberg published a number of romances, which have been translated into English, as *The Freebooter of the Baltic*; *The Last Athenian*; *Adventures of Little Vigg*; *Roman Legends*; etc. He also published several extremely rationalistic works on religious and Bible subjects, as *Doctrine of the Bible on Christ*; *Jehovah Worship among the Hebrews*; *Pre-existence of Man*, and *Eschatology* (1880). His *Poems* were published in 1882, and his investigation in *German Mythology* in 1886.

RYDQVIST, JOHAN ERIK (1800-78), a Swedish philologist. See SCANDINAVIAN LANGUAGES, Vol. XXI, p. 372.

RYE, the common name of species of *Secale*, a genus of grasses allied to wheat and barley. One species (*S. cereale*) is a well-known grain. It has, when in fruit, a roundish-quadrangular spike, with a tough rachis. Its cultivation does not extend so far north as that of barley, but it grows in regions too cold for wheat and on soils too poor and sandy for any other grain. Its ripening also can be more confidently reckoned upon in cold regions than that of any other grain. But rye succeeds best, and is most productive, in a climate where wheat ripens. It is extensively cultivated in the Middle Atlantic and Northeastern states, in Ohio and Michigan and other Western states. Rye grows best on a rich sandy loam, but it will flourish on light soils not adapted to other white crops. The soil should be prepared for rye in the same manner as for wheat. There is but one species of rye used as grain, but this is divided into two varieties, known as spring

and winter rye. Winter rye is sown late in August or early in September, from one to two bushels of seed per acre being used, according to the quality of the soil. Except for harrowing and rolling in the spring, no after-cultivation is necessary.

RYE-GRASS. See AGRICULTURE, Vol. I, p. 375.

RYE HOUSE PLOT, in English history, an alleged conspiracy organized in 1683 at the Rye House, Hertfordshire, to assassinate Charles II and his brother, the Duke of York, in the interests of a Protestant succession. See also MONMOUTH, Vol. XVI, p. 756.

RYE IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

RYLE, JOHN CHARLES, an English bishop; born in Macclesfield, May 10, 1816; educated at Eton and Christ Church, Oxford, and ordained in the English Church in 1841, when he became curate of Exbury. In 1844 he was made rector of Helmingham, and in 1861 he became vicar of Stradbroke. He soon became widely known as the writer of pithy, forcible tracts of decided evangelical sentiment. In 1880 Lord Beaconsfield called him to be bishop of the newly founded diocese of Liverpool. Ryle published *Expository Thoughts on the Gospels* (6 vols.); *Plain Speaking*; *Christian Leaders a Hundred Years Ago*; *Bishops and Clergy of Other Days* (1869); and *Church-Reform Papers* (1870); and a large number of tracts, many of which have been reprinted in French, German, Dutch, Portuguese, Italian, Russian, Hindustani and Chinese.

RYOTWARI or RYOTWARAY. See INDIA, Vol. XII, p. 771.

RYSWICK, PEACE OF. See FRANCE, Vol. IX, p. 580.

S

SAALE RIVER—SACHAU

SAALE RIVER. See ELBE, Vol. VII, p. 825.

SAARDAM. Same as ZAANDAM. See Vol. XXIV, p. 761.

SABA, a small island of the Lesser Antilles, in the West Indies. It is high and rocky; the inhabitants are of Scotch descent, but the island belongs to the Dutch. It is a dependency of Curaçao. Population 1890, 1,883.

SABADELL, a town of Spain, in the province of Barcelona, on the Northern Company railroad. It is 10 miles N. of Barcelona and about 60 miles S. of the Pyrenees Mountains. It is a manufacturing town of importance, and has a number of woolen and cotton spinning and weaving factories. Population, 19,645.

SABADILLA OR CEBADILLA. See VERATRUM, Vol. XXIV, p. 163.

SABÆANS. See YEMEN, Vol. XXIV, pp. 738-741.

SABAKA OR SHABAK, a conqueror of EGYPT. See EGYPT, Vol. VII, p. 742.

SABANILLA, a village and seaport of the department of Bolivia, Colombia, near the mouth of the river Magdalena; connected by railway with Barranquilla, on the river, and is the port of that place. The port is shallow and the population small.

SABATIER, PAUL, a French evangelist; born Aug. 3, 1858, at St. Michel de Chabrillanoux, Cevennes. After studying theology in Paris from 1880 to 1885, he preached at Strasburg until 1889, when, to escape compulsory German naturalization, he retired to St. Cierge-la-Serre, in the Cevennes, and carried on evangelization among the peasants. In addition to a number of sermons, he published a *Life of St. Francis of Assisi*, an English translation of which appeared in 1894.

SABBATHAI LEWI OR ZEBI. See JEWS, Vol. XIII, p. 681.

SABBATICAL YEAR. See SABBATH, Vol. XXI, pp. 126, 127.

SABELLIAN DIALECT. See ROMANCE LANGUAGES, Vol. XX, p. 661.

SABINE RIVER AND PASS. The river rises in Hunt County, Texas, and flows southeast to the western boundary of Louisiana, thence southward, forming the boundary between Texas and Louisiana, until it enters the Gulf of Mexico through SABINE PASS, which is the mouth of Sabine River. The pass has a muddy bar with shoal water and a narrow channel; dredging has been undertaken to improve it. There is a brick lighthouse on Brand Point with a flashing dioptric light of the third order. The Southern Pacific railroad passes here.

SABISM. See SABIANS, Vol. XXI, p. 128.

SABLE. See MARTEN, Vol. XV, p. 577.

SABLE, CAPE, the most southern point of the peninsula of Florida, lat. 25° 6' N., long. 81° 9' W. The site of Fort Poinsett.

SABLE, CAPE, a point in the extreme south of Nova Scotia, at the south end of Cape Sable Island, in Barrington Township, Shelburn County; has a lighthouse. The island is mostly inhabited by fishermen, descended from loyalists who left the United States during the Revolution. Population 1891, 2,117.

SABLE ISLAND. See NOVA SCOTIA, Vol. XVII, p. 601.

SABRINA. See AZORES, Vol. III, p. 170.

SACALINE. See POLYGONUM, in these Supplements.

SACCHARINE. See CHEMISTRY, in these Supplements.

SACCHAROMETER. See BREWING, Vol. IV, pp. 265, 266.

SACCHAROMYCES. See FERMENTATION, Vol. IX, p. 96.

SAC CITY, a city and the capital of Sac County, central northwestern Iowa, 42 miles W. of Fort Dodge, on the Chicago and North-Western railroad, and on the north fork of the Racoon River. It is in a dairying and stock-raising district, and has a flour-mill, foundries, a machine-shop and a lighting-rod factory. Population 1890, 1,249; 1895, 1,606.

SACCOMYIDÆ, a family of small rodents which resemble mice. Many species have long, kangaroo-like hind limbs and a long tail. They are remarkable for their large cheek-pouches, formed by an infolding of the skin of the head. This characteristic has given the popular name pocket-mice. The members of the genus *Dipodornys* are sometimes called kangaroo-rats (q.v., in these Supplements). The *Sacomys* are inhabitants of western North America.

SACCOPHERYNGIDÆ, a family composed of several species of deep-sea fishes, which are believed to have affinities with the eels. Like many other deep-sea fishes, the body is very soft and delicate, and in consequence their anatomy is not well known. They have many peculiarities which are of interest to anatomists. These fishes have been classed in an order called *Lyomeri*, which name, signifying looseness, refers to the many anatomical features which are anomalous among fishes.

SACCULINA. See CRUSTACEA, Vol. VI, p. 647.

SACHAU, KARL EDUARD, a German Orientalist; born in Neumünster, Holstein, July 20, 1845. After studying at Kiel and Leipsic, he became professor extraordinary in 1869 and ordinary professor in 1872 of Semitic languages at the University of Vienna; in 1876 was appointed professor of Semitic languages at the University of Berlin, and was elected to the Royal Prussian Academy of Sciences in 1887. He founded and became director of the Seminary for living Oriental Languages. Among his writings are *Inedita Syriaca* (1870); *Chronologie Orientalischer Völker von Alberuni* (1878); *Kurzes*

Verzeichniss Syrischer Handschriften (1885); *Alberuni's India* (1887-88); *Die Inschrift des Königs Panammu von Sam'al* (1893).

SACHER-MASOCH, LEOPOLD VON, an Austrian author; born in Lemberg, Galicia, Jan. 27, 1836; studied at Prague and Gratz and was for a time teacher at the latter university, but soon gave himself up entirely to literature. With M. R. Armand he founded a review, which displayed sympathy for France, entitled *Auf der Höhe*, and in January, 1883, was made a chevalier of the Legion of Honor. Besides two historical works, *Der Aufstand in Gent unter König Karl V* (1857) and *Ungarns Untergang und Maria von Oesterreich* (1861), he published numerous novels, the best known of them being the series known as *Cain's Inheritance*. He died March 9, 1895.

SACHS, BERNARD, an American neurologist; born in Baltimore, Maryland, Jan. 2, 1858. After completing the courses in the New York schools and at Harvard University, he went abroad and studied medicine at Strasburg, Berlin, Vienna and London. Returning to New York, he was in 1888 made professor of nervous diseases in New York Polyclinic; in 1890, neurologist to Montefiore Home, and in 1893 to Mount Sinai Hospital. He was elected president of the American Neurological Association for 1894. Among his published works, mostly monographs containing an account of original investigations, especially in the nervous diseases of children, are *Cerebral Hemorrhage, Embolism and Thrombosis* (1892); *Chorea* (1892); *Criminal Insanity* (1894); and *Nervous and Mental Diseases of Childhood* (1894).

SACHS, JULIUS, an Austrian botanist; born in Breslau, Silesia, Oct. 2, 1832; educated at the University of Prague; assistant in physiological botany at Tharandt in 1859; professor of botany at Bonn in 1861; at Freiburg in 1867, and the following year at Würzburg, where he established an institute for the study of plant physiology. Among the best known of Sachs's botanical works are *Handbuch der Experimental-Physiologie der Pflanzen* (1865); *Lehrbuch der Botanik* (1868), translated into English under the title, *Text-book of Botany, Morphological and Physiological; Geschichte der Botanik* (1875); and *Abhandlungen über Pflanzen-Physiologie* (1892). These works have had a very great influence in bringing about an advance in the science of vegetable physiology.

SAC INDIANS. See *Sacs*, under INDIANS, Vol. XII, p. 832.

SACKBUT. See *TROMBONE*, Vol. XXIII, p. 586.

SACKETT'S HARBOR, a village and port of entry in Jefferson County, New York, on the south shore of Black River Bay, 8 miles E. of Lake Ontario and 170 miles N.W. of Albany, having a navy-yard, barracks, mills, etc. It is the best harbor on the lake for ship-building. The *Oneida*, the first United States war vessel ever launched on Lake Ontario, was built at Sackett's Harbor in 1809. In the War of 1812 it was an important port, where the frigate *Superior*, of 66 guns, was built in 80 days, and the *Madison* in 45 days, from timber standing in the forest. Population 1890, 787.

SACKVILLE, a town of Westmoreland County, New Brunswick, at the head of the Bay of Fundy, on the Intercolonial railroad, and 129 miles N.E. of St. John. It has a good harbor and a steam tannery, factories, foundries, a brick trade; has Mount Allison College and Wesleyan male and female seminaries. Population 1891, 1,500.

SACKVILLE, VISCOUNT, or GERMAIN, LORD GEORGE, an English soldier and publicist, son of the Duke of Dorset; born Jan. 26, 1716; studied at Westminster School and in Dublin at Trinity College; served in the Seven Years' War, commanding the allied cavalry under Prince Ferdinand of Brunswick at the battle of Minden in 1759, but for disobedience of orders he was returned to England, court-martialed and dismissed from the service. At the accession of George III, in 1760, he was restored to favor, entering Parliament in 1761 and the Privy Council in 1766. He took the name of Germain upon inheriting the estates of Lady Germain in 1770. In 1775 he became Secretary of State for the Colonies in Lord North's Cabinet, retaining the post until the close of the American Revolutionary War. He was created a viscount in 1782, and died Aug. 26, 1785. Sackville was one of those suspected of being the author of the letters of Junius. See JUNIUS, Vol. XIII, p. 776.

SACKVILLE, LIONEL SACKVILLE WEST, BARON, an English diplomatist; born July 19, 1827, at Bourn Hall, Cambridgeshire. He was educated at home; was assistant précis writer to the Earl of Aberdeen, Secretary of State for Foreign Affairs in 1845; entered the diplomatic service in 1847; served as attaché to her Majesty's legations in Lisbon, Naples, Stuttgart and Berlin, till 1858; as secretary of legation in Turin, Madrid and Berlin; and secretary of embassy in Paris till 1872; was appointed envoy extraordinary and minister plenipotentiary to the Argentine Republic (1873); transferred to Madrid (1878); and to the United States (1881). He negotiated, in conjunction with Sir James Hudson, the commercial treaty with Sardinia (1863); represented her Majesty's government and that of Denmark at the conferences of Madrid on the affairs of Morocco (1880); was minister plenipotentiary at the conference in Washington on the affairs of Samoa (1887); and negotiated, in conjunction with Mr. Joseph Chamberlain and Sir Charles Tupper, the fisheries treaty of Washington (1888). He received his passports from the United States government in 1889, and was recalled to England, owing to an injudicious letter written to a Mr. Osgoodby, who had sent him a letter of enquiry in the false name of Murchison. In his reply he stated that the election of a Democratic President would be received with favor in England. In 1895 he made himself ridiculous by the publication of an attempt at self-exculpation and an account of a bogus plot against his life.

SACKVILLE, THOMAS. See *DORSET, EARL*, Vol. VII, pp. 372, 373.

SACO, a town of Maine. The river is crossed by 4 bridges, contains a public high school, 14 public school buildings, Thornton Academy, 2 libraries and 4 banks; has manufactories of lumber, boots

and shoes, brushes and belting. Old Orchard Beach, about three and a half miles from the city, is a very popular summer resort, and has large hotels and fine grounds. Population 1890, 6,075. See also SACO, Vol. XXI, p. 131.

SACO, JOSÉ ANTONIO, a Cuban author and publicist; born in Bayamo, May 7, 1797; best known for his important works on the history and effects of slavery. He was frequently exiled for political reasons, and often sat as a deputy in the Spanish Cortes. Among his writings are *Paralelo entre Cuba y Algunas Colonias Inglesas* (1838), and *Historia de la Esclavitud desde los Tiempos mas remotos* (1876). He died in Barcelona, Spain, Sept. 26, 1879.

SACO RIVER. See MAINE, Vol. XV, p. 298.

SACRAMENTO, the capital of the state of California. It is on the Southern Pacific railroad. The United States reports for 1890 show the following in regard to the mechanical and manufacturing industries of Sacramento: Number of establishments reporting, 302; aggregate capital, \$5,654,782; average number of employees, 4,510; average total wages, \$2,967,954; total value of products, \$10,424,582. The Crocker Art Gallery and the California State Bank are among the finest recent buildings. Sacramento has 22 churches, of which 6 are Methodist Episcopal, 4 Baptist, 3 Congregational, 2 Presbyterian, 2 Lutheran, 1 Protestant Episcopal, 1 Roman Catholic, 1 Unitarian, 1 Christian and 1 Jewish. The city has 1 high-school, 6 primary and 3 grammar-schools, 1 ungraded school and 1 night school. The school census for 1894 reports 109 teachers and 6,500 pupils. It has, besides, 6 private schools, 1 free public library and 1 state library; the latter is in the capitol building, and contains 94,752 volumes. Sacramento has the Protestant Orphan Asylum, Ridge Home (a private hospital), City Dispensary, the Southern Pacific Hospital, Marguerite Home for Old Women, Woman's Christian Temperance Union Mission, the Children's Day Home, the city and county jail. Population 1890, 26,386. See also SACRAMENTO, Vol. XXI, p. 132.

SACRAMENTO RIVER. See CALIFORNIA, Vol. IV, p. 696.

SACRED HEART, LADIES OF THE, a Roman Catholic order of nuns, founded in France in 1800, by Joseph Varin, a Jesuit priest, and Madalene Josephine Barat, who became first superior-general of the congregation. Pope Leo XII gave the order his approval in 1826. Its rules and system of education are based upon those of the Jesuits, and its mother-house is located in Paris. The congregation was introduced into the United States in 1818, the first settlement being made by Philippine Duchesne, at Florissant, Missouri. From this point they spread through all parts of the United States.

SACRED HEARTS OF JESUS AND MARY, a Roman Catholic brotherhood founded at Lyons, France, in 1821, by André Coindre. The order was established in the United States at Mobile, Alabama, in 1847. Since that time the community has spread rapidly, its work being very largely educational.

SACRUM. See ANATOMY, Vol. I, p. 821.

SADDLE. See HORSE, Vol. XII, p. 198; and also SADDLERY, Vol. XXI, p.

SADOWA, BATTLE OF. See KÖNIGGRÄTZ, Vol. XIV, p. 138.

SAFED, one of the holy cities of the modern Jews in Palestine, situated on a hill, 2,700 feet above the Mediterranean, 6 miles N.W. of the Sea of Galilee and 13 miles N.W. of Tiberias. The town was destroyed by an earthquake in 1837, which killed about four thousand Jews. Again, in 1859, the town was damaged and many lives were lost. A castle of the Christians, built during the Crusades, was destroyed by the sultan of Damascus in 1220, and, having been rebuilt by the Templars, was again destroyed in 1266. Safed is the seat of a noted Jewish school. Population, Jews, 12,000; Moslems, 5,000; and Christians, 200.

SAFE-DEPOSIT COMPANIES, corporations for the safe keeping of valuable personal property, as money, bullion, stocks, bonds, jewelry, plate, etc. Such companies are in operation in many of the large cities of the United States. Among the earliest of such companies in the United States are the Safe-Deposit Company, chartered in New York in 1861, and the Fidelity Safe-Deposit Company, established by Nathaniel B. Browne at Philadelphia in 1867. These companies are now to be found in all large cities in the United States, and they are authorized to act as trustees of all kinds of property in most states of the Union. In the state of New York they are organized under a general law enacted in 1872. This law authorizes the formation of stock companies for the purpose of taking and receiving upon deposit as bailees, for safe-keeping and storage, all kinds of valuable goods and papers, and guaranteeing their safety on such terms as may be agreed upon between them and their patrons. It also authorizes them to construct and let out safes, vaults and other receptacles necessary for their business purposes. The affairs of these companies are managed by trustees elected annually by the stockholders, the latter being jointly and severally liable for all debts equal to the par value of their stock. These corporations are under the supervision of the bank superintendent. They have to make semi-annual reports to the latter, and are subjected to annual examinations by him. On Jan. 1, 1888, the combined capital of the safe-deposit companies in the state of New York amounted to three millions of dollars. In most of the other states of the Union such companies are created by special legislative enactments, but their business is carried on after the same general plan as the business of the New York companies.

In all of these establishments strong fire-proof vaults are built. These are constructed of steel and iron plates welded together and surrounded with masonry. Their interiors are fitted up with tiers of safes and deposit-boxes of sizes suitable for all requirements. The whole is under the surveillance of armed watchmen both day and night. Minute personal descriptions of their patrons are entered into books kept for the purpose of identifying them. Private passwords are also given to the patrons and entered upon the books. On renting a safe the

holder is furnished with the only key or keys that will fit its lock, no others being the same. Also see *SAFES*, Vol. XXI, p. 145.

SAFETY APPLIANCES FOR MINES. Where a level of a mine meets the perpendicular shaft it is customary to place what is known as a chair, or landing-dog, which may be thrown out to support a mine-cage when it is stopped opposite the level. It was formerly the custom, in order that the engineer of the hoisting-apparatus might know the position of the different chairs, to connect them with the engine-room by means of wires and bell-cranks, operating pointers on dials. This method was not wholly satisfactory, affording opportunity for a variety of accidents, and it has been superseded in many mines within recent years by an electrical-chair indicator of simple construction, that secures greatly increased safety. It also expedites the work, as engineers do not have to slow down to feel for the chairs. Any form of annunciator or semaphore may be employed with this electrical indicator, but a system of red and white disks is usually preferred. When a chair is in a normal position, leaving the shaft clear, the circuit is closed and a white disk is displayed before the engineer, but if a chair is thrown into the shaft the circuit is opened and a red disk flashes out, eclipsing the white disk in front of the engineer. The method is so simple that an error is hardly possible, and in case of any accident to the wires, breaking the circuit, or if they should be willfully cut, the red danger-signal is promptly brought before the engineer.

Workmen have sometimes been injured by allowing long tools to project from a car in going up or down a shaft. To prevent such accidents a safety tool-car has been introduced, which overcomes the difficulty in a simple manner. The sides and ends of the car are made to slope inwardly from the bottom, so as to turn all unprotected points and handles toward the center of the shaft. These safety tool-cars are also conveniently arranged with hand-holes for propelling and links for attachment to the cages.

A safety device for mine-cages, which insures absolute support for the cages should the hoisting-rope break, has been largely introduced. At the sides of the shaft are placed a series of stout projecting stops. Thrust-pieces from the sides of the cage are arranged to be pushed into these by the action of the hoisting-rope in breaking, should such accident occur. A stout spring is set in the top of the cage, being held up and back by the strain of the hoisting-rope. The instant this strain is removed, as by breaking of the rope, the spring acts and forces the thrust-pieces against the stops on the side of the shaft, stopping the descent of the cage.

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SAFETY-LAMP. See *COAL*, Vol. VI, pp. 72, 73.

SAFETY-VALVE. See *STEAM-ENGINE*, Vol. XXII, p. 497.

SAFFL. See *SAFI*, in these Supplements.

SAFFORD, TRUMAN HENRY, an American astronomer and mathematician; born in Royalton, Vermont, Jan. 6, 1836. He early attracted attention by

his remarkable feats of calculation. Even as a child, there was hardly a problem in figures given him that he could not mentally solve. He prepared an almanac when only nine years of age, and from that time, or at least after he had graduated, as he did, from Harvard, in 1854, he put his wonderful powers to practical use. He spent several years in the observatory at Hartford, and in 1865 was appointed professor of astronomy in the University of Chicago and director of the Dearborn Observatory. His work in the latter city included the discovery of several new nebulae, but the great fire of 1871 cut it short. After this he was astronomer of the United States engineers in territorial surveys, taking part in Captain Wheeler's surveys of the far West. In 1876 he became professor of astronomy at Williams College. Professor Safford made several catalogues and maps of the stars.

SAFFRANINE, $C^{18}H^{14}N^4$ or $C^{18}H^{16}N^4O$, a red dye prepared by oxidizing a mixture of certain aniline bases and belonging to the group of phenazine dyes. A number of derivatives are known, and are used to dye silk and wool various shades of red or scarlet.

SAFI or **SAFFI**, a seaport of Morocco, Africa, 120 miles W.N.W. of the city of Morocco. It is surrounded by walls, ditches and a ruined citadel, and is built at the bottom of a ravine. The place was held by the Portuguese for many years up to 1648, when they abandoned it. The shrine of the Seven Sleepers here is visited by both Moslems and Jews. Safi at one time had a large trade with Europe, but has declined much since the rise of Mogador. Population, 9,000.

SAGA. See *EDDA*, Vol. VII, pp. 649-651; and also, *SNORRO STURLUSON*, Vol. XXII, p. 201.

SAGAR or **SAUGOR**, a low, swampy island at the mouth of the Hugli, the holiest branch of the Ganges, 23 miles long and 8 miles wide; celebrated as a station for Hindu pilgrims. A cyclone struck the place in 1864, killing three quarters of the inhabitants. It is uncultivated, covered with jungles and infested with wild beasts.

SAGASTA, PRAXEDES MATEO, a Spanish statesman; born July 21, 1827, at Torrecilla de Cameros, and educated at the School of Engineers, at Madrid. From 1854 to 1856 he represented the town of Zamora in the constituent Cortes. In 1856 he was compelled to seek shelter on French territory, having engaged in the revolutionary movement. He returned to Spain on an amnesty being proclaimed, becoming a professor in the School of Engineers, at Madrid, and also edited *La Iberia*, the leading organ of the Progressist party. He again conspired in 1866, and was again compelled to fly. He became Minister of State in 1870, and in 1874 he was successively Minister for Foreign Affairs, Minister of the Interior, President of the Council and Prime Minister from 1881 to 1883. His ministry was followed by the Premiership of Señor José Posado Herrera. Sagasta, on the resignation of the Canovas ministry at the death of King Alphonso XII, resumed office as the head of a new Liberal ministry. Among the acts of his administration may be mentioned the passing of the Anglo-Spanish commercial treaty.

He retired in 1890, but was again Premier from 1893 to March, 1895.

SAGE, HENRY WILLIAMS, philanthropist and capitalist; born in Middletown, Conn., January 31, 1814; died Sept. 17, 1897. He established extensive lumber factories in Canada and the United States, and was one of the largest land-owners in the State of Michigan. A prominent churchman, he took great interest in educational affairs, and was instrumental in settling the question of co-education at Cornell University, in the founding of Sage Hall for women. His bequests to other institutions were very large, his gifts to Cornell alone aggregating over one million dollars. He was a descendant of David Sage, who settled in Middletown, Conn., in 1652.

SAGE, RUSSELL, an American capitalist; born in Oneida County, New York, Aug. 4, 1816. He early engaged in business in Troy, New York, and later removed to New York City, where by judicious investments in railroad stocks, he acquired a fortune. Afterward he became interested in the elevated-railroad system of New York City, and in various cable and telegraph companies. From 1841 to 1857 he took a part in politics, and was elected to Congress in 1853 and again in 1855. In December,

1891, an attempt was made to assassinate Mr. Sage by the throwing of a dynamite bomb. He shielded himself by interposing between himself and the explosive one of his clerks, W. R. Laidlaw, who was severely injured in the explosion. Laidlaw brought suit to recover damages from Mr. Sage for the injuries sustained, and, June 9, 1895, the court awarded him \$40,000.

SAGE—BRUSH, the common name given to the numerous species of *Artemisia*, of the family *Compositae*, natives of the plains and western mountains of North America. They are low shrubs or herbs, bitter-aromatic, with alternate leaves and small heads of yellowish or whitish flowers.

SAG HARBOR, a village and port of entry of Southampton Township, Suffolk County, New York, on Gardiner's Bay, an inlet of the Atlantic Ocean, about one hundred miles from New York. It is the eastern terminus of a branch of the Long Island railroad, and has a fine harbor, banks, newspapers; has a cotton, a morocco and a watch-case factory, and cigar and pottery works. Population 1890, 2,640.

SAGINAW, a city of Michigan. The following railroads enter the city: The Michigan Central, Flint and Péré Marquette, the Detroit, Lansing and Northern, the Cincinnati, Saginaw and Mackinaw, the Saginaw, Tuscaloon and Huron and the Saginaw Valley and St. Louis. The city has 42 churches, 2 high-schools, 22 public schools, 4 public libraries,

5 national banks, 2 state, 3 savings and 2 private banks, and 4 daily papers. The principal industries are tobacco, cigar and cigarette factories, carriage and wagon, furniture, cooperage and malt-liquor plants. The United States census for 1890 shows the following in regard to the mechanical and manufacturing industries of Saginaw: Number of establishments reporting, 335; aggregate capital, \$12,406,823; average number of employees, 5,716; total amount of wages, \$2,653,135; total value of products, \$11,303,006. The present city of Saginaw was created by act of the legislature, on March 3, 1890, which consolidated the two cities of Saginaw and East Saginaw. Before the consolidation East Saginaw was the more important of the two. On May 21, 1893, a disastrous fire broke out in the city and laid the finest portion of it in ruins; several lives were lost, and property valued at \$1,500,000 was destroyed. A portion of the Bristol bridge, one of the bridges joining East Saginaw and Saginaw, was burned. Population 1890, 46,322; 1894, 44,642. See also SAGINAW, Vol. XXI, p. 148.

SAGINAW RIVER, a river of Michigan, formed by the confluence of the Flint and Shiawassee rivers. It flows north 30 miles to Saginaw Bay, and is navigable for 24 miles by steamers drawing 10 feet of water. SAGINAW BAY is an arm of Lake Huron. It is 60 miles long and 30 wide, and has several fine harbors.

SAGUENAY RIVER. See QUEBEC, Vol. XX, p. 165.

SAHARA OR GREAT DESERT. See SAHARA, Vol. XXI, p. 149, and AFRICA, in these Supplements.

SAÏD PACHA. See EGYPT, Vol. VII, p. 766.

SAIL—FISH, the popular name of fishes of the genus *Histiophorus*, characterized by a large dorsal fin, which by its resemblance to a sail has suggested the name. The greatly modified ventral fins are composed of several long slender rays. The sail-fishes, also known as banner-fishes, are found in warm seas, especially the Indo-Pacific. They are very active fishes, like their near relatives, the sword-fishes.

SAINT AFFRIQUE, a town in the southern part of France in the department of Aveyron, 18 miles S. of Millau and 41 miles N. W. of Montpellier, on the South railroad. It manufactures cloths, serges and wines. Population 5,572.

ST. ALBANS, a town of Vermont. It contains eight churches, a high-school, a public graded school, an academy, two convents, a public library, a home for children, a hospital, a national bank and a trust company, and a daily, a weekly and a monthly periodical. Population 1890, 7,771. See also ST. ALBANS, Vol. XXI, p. 156.

ST. ANDREW, ORDER OF. See ANDREW, in these Supplements.

ST. ANDREWS, a seaport town of New Brunswick, Canada, 60 miles S.W. of St. Johns. It is a summer and bathing resort, and has a tidal harbor 35 feet deep. Population 2,500.

ST. AUGUSTINE, a town of Florida. The majority of the population are Roman Catholics, though the other religious denominations are well repre-



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sented. The Memorial Presbyterian Church is a famous structure. There are good schools and colleges, and there is an institution for the education of the deaf and blind. Cigar-making is the only manufacturing industry. Population 1890, 4,742. See also ST. AUGUSTINE, Vol. XXI, p. 158.

ST. BARTHOLOMEW'S DAY MASSACRE. See FRANCE, Vol. IX, pp. 561, 562.

ST. BERNARD DOGS. See DOGS, Vol. VII, p. 327.

ST. BERNARD PASS, the general name given to two of the best-known and most-frequented passes of the Alps, and distinguished by the designations, Great St. Bernard and Little St. Bernard. The first is in the Pennine Alps, between the Swiss canton of Valais and the valley of Aosta, in the compartment of Piedmont, Italy, lying to the eastward of Mont Blanc, at an elevation of over eight thousand feet. Near the highest part of the pass is the celebrated hospice, founded in 962 by Bernard de Menthon for the succor of wayfarers. For nine months in the year the pass is covered with snow, which sometimes in the winter reaches a depth of forty feet. The monks of the hospice were aided in their work by the St. Bernard dogs, a breed noted for their size and sagacity. This pass was traversed by the armies of the Romans, by Charlemagne, by Frederick Barbarossa, and in 1800 by Napoleon in his invasion of Italy.

The LITTLE ST. BERNARD lies to the southward of Mont Blanc, leading across the Graian Alps from the valley of the Isère, in Savoy, France, to the valley of Dona Baltea, Piedmont. It has a height of 7,200 feet, and near the summit has a convent believed to have been founded by Bernard de Menthon for the aid of travelers. This pass is comparatively easy to cross, and the fact that it was the route taken by Hannibal has been fairly well established.

ST. BONIFACE, a town of Manitoba, a suburb of Winnipeg, from which it is separated by the Red River. It is entirely a French-Canadian town, and is the headquarters in the West for the Canadian Roman Catholic Church. Bishop Provencher, who in 1818 came here, changed its original name of La Fourche to its present one. Here are good schools for French Canadians. Population 1890, 2,000.

ST. BRENDAN OR BRANDAN. See CELTIC LITERATURE, Vol. V, pp. 304, 325, 326.

ST. CATHARINES, a city of Ontario, Canada. Population 1891, 9,170. See ST. CATHARINES, Vol. XXI, p. 159.

ST. CÉSAIRE, a town of Rouville County, Quebec, Canada, 33 miles E. of Montreal, on the Yamaska River. It has good manufactures and a fine water-power; has an astronomical observatory, a museum of mineralogy and zoölogy, and is the site of Ste. Croix College, which is a branch of an institution of the same name situated in Neuilly, a suburb of Paris, France. Population, 5,200.

ST. CHARLES, a city of Kane County, north-western Illinois, 35 miles W. of Chicago, on the Chicago and North-Western railroad, and on the Fox River. It has abundant water-power, and manufactures of flour, paper and files, a foundry and

machine-shop. Butter and cheese are largely produced; farm produce and live-stock are extensively shipped. Population 1890, 1,690.

ST. CHARLES, a city of Missouri. Population 1890, 6,161. See ST. CHARLES, Vol. XXI, p. 159.

ST. CLAIR, a city in St. Clair County, southeastern Michigan, 12 miles S. of Port Huron and 47 miles N.E. of Detroit, on the St. Clair River, and on the Michigan Central railroad. It has a ferry connecting with Courtwright, on the Canadian side of the river, and has three public schools, Ladies' Library Association, a system of water-works and a bank. Has ship-yards, planing, sash and door, salt and other factories; grain and hay are largely shipped; has also mineral springs. Population 1890, 2,353; 1896, 2,575.

ST. CLAIR, a borough of Pennsylvania. It has four public schools and one parochial, ten churches, and improved water-works. Its inhabitants are engaged in the manufacturing of mining-implements. Population 1890, 3,680. See ST. CLAIR, Vol. XXI, p. 160.

ST. CLAIR, lake and river. See ST. LAWRENCE, Vol. XXI, p. 179.

ST. CLAIR, ARTHUR, an American general; born in Thurso, Scotland, in 1734, and educated at the University of Edinburgh. He served in the British army as lieutenant at Louisburg and Quebec in 1758; resigned his commission in 1762, and in 1764 bought land near Ligonier, Pennsylvania, settling there and building mills. He became justice of the court of common pleas, held other local offices, accepted a colonel's commission in the Continental armies in 1775; took part in the expedition against Quebec; rendered valuable services at the battle of Princeton. He was appointed major-general in 1777; succeeded Gates in command of Ticonderoga, but being forced to evacuate that post he was retired from his command, but was later justified in his action by a court-martial; distinguished himself in the southern campaign under Greene, and in the one terminating at Yorktown; was president of Congress in 1787, and was appointed governor of the Northwest Territory in 1789. In 1791 he was appointed commander-in-chief of the United States army, but owing to his defeat by the Miami Indians he resigned in 1792. He was removed from the governorship of the Northwest Territory in 1802, and retired to Greensburg, Pennsylvania, where he died Aug. 31, 1818.

ST. CLAIRSVILLE, a village and the capital of Belmont County, eastern Ohio, 10 miles W. of Wheeling, West Virginia, on the St. Clairsville division of the Baltimore and Ohio railroad and on the St. Clairsville and Northern railroad. Coal and limestone occur abundantly in this district. Population 1890, 1,191.

ST. CLOUD, a city and the capital of Stearns County, eastern central Minnesota, about 60 miles N.W. of St. Paul, on the west bank of the Mississippi River, a short distance below the mouth of the Sauk River, and on branches of the Great Northern and the Northern Pacific railroads. There is abundant water-power, and manufactures of flour, lumber, wagons, etc. It is the center of a district containing

lumber and granite. A state normal school and the State Reformatory are located here. Population 1890, 7,686.

ST. CROIX RIVER. See NEW BRUNSWICK, Vol. XVII, p. 373.

ST. CROIX RIVER, a stream which rises in Douglas County, Wisconsin, and flows southwest to the Minnesota line, and from this point, for over one hundred miles, flows southward, forming the boundary between Wisconsin and Minnesota, and passing through Lake St. Croix, flows into the Mississippi at Prescott, Wisconsin. This stream is 150 miles long. It is navigable 54 miles, to the Dalles, and is of importance to the lumbering interests in floating logs from the timber regions.

SAINT CUTHBERT'S BEADS. See *Crinoidea*, under ECHINODERMATA, Vol. VII, pp. 637, 638.

ST. DENIS REUNION. See REUNION, Vol. XX, pp. 491-493.

ST. DIZIER, a town in the department of Haute-Marne, northeastern France, on the Marne River and the East railroad. In 1544 St. Dizier resisted for a month the assaults of a Spanish army under Ferdinand de Gonzaga.

STE. ANNE DE BEAUPRÉ, a village of Montmorency County, Quebec, Canada, on the north shore of the St. Lawrence, at the mouth of the Ste. Anne, a left-hand affluent of the St. Lawrence. Many miraculous cures have been attributed to relics of Ste. Anne which are contained in the parish church; the great feast-day of the patron saint is on the 26th of July, when many pilgrimages are made to her shrine. St. Anne Falls, about three miles distant, afford in their neighborhood good fishing for salmon and trout. Population 1890, 300.

STE. GENEVIEVE, a city and the capital of Ste. Genevieve County, eastern Missouri, on the right bank of the Mississippi River, about 50 miles S. by E. of St. Louis, and on the Chester, Perryville, Ste. Genevieve and Farmington railroad. It has copper-mines, flour-mills, lime-kilns, etc., and is the center of a region devoted to agriculture, stock-raising, fruit-growing and wine-making. Population 1890, 1,586.

ST. ELIAS, a mountain in the northwest of North America, ascertained by triangulation to lie within the Canadian boundaries in lat. $60^{\circ} 17' 34.4''$ N., and long. $140^{\circ} 55' 19.6''$ W. Its height as determined by the United States Coast and Geodetic Survey is 18,100 feet. The mountain is not volcanic, nor is it, as was long reputed, the highest peak in North America, being surpassed by Mount Orizaba in Mexico and probably by Mount Logan, 26 miles N.E. of St. Elias.

ST. FRANCIS RIVER, a tributary of the Mississippi, rising in St. Francois County, southeastern Missouri; flows in a southerly direction through Missouri; forms part of the boundary between Arkansas and Missouri, and, entering the former state, flows almost parallel with the Mississippi until it enters that stream near Helena. In its course through Arkansas it expands into long lakes, probably parts of an old bed of the Mississippi, or, according to some, depressions due to a sinking of the soil in the great earthquake of 1811. The St. Francis is navigable for a distance of 150 miles, and serves as a back-water in overflows of the Mississippi.

ST. FRANCIS RIVER, one of the great tributaries of the St. Lawrence; rises in Lake St. Francis, Beauce County, southeastern Quebec; flows southwesterly to Lennoxville, and then in a northwesterly direction until after a course of 120 miles it empties into the St. Lawrence at Lake St. Peter. Owing to the number of rapids in its course it is of very little value for navigation.

ST. FRANCIS XAVIER COLLEGE, an educational institution, founded in New York City by the Jesuit order in 1847, and granted collegiate powers in 1861 by the regents of the University of the State of New York. The buildings of the institution are situated on Fifteenth Street, west of Fifth Avenue, having a frontage of 275 feet and a depth of 200 feet to Sixteenth Street. The school has four departments,—preparatory, grammar, collegiate and post-graduate. The president and members of the faculty are chosen from the Society of Jesus. In 1895-96 the institution had 900 students, 30 instructors, and a library of 25,000 volumes.

ST. GALL MONASTERY. See ABBEY, Vol. I, pp. 12, 13.

SAINT GAUDENS, AUGUSTUS, an American sculptor; born in Dublin, Ireland, March 1, 1848. He was taken to New York when only six months old.

In 1861 he began to draw at Cooper Institute, and in 1865-66 he was a student at the Academy of Design. In 1867 he went to Paris, where he studied at the École des Beaux-Arts until 1870. Then he went to Rome, and there produced his first work, *Hiawatha*. In 1872 he returned to New York, where he afterward resided. His statues include *Admiral Farragut*, in New York; *Robert R. Randall*, at Sailors' Snug Harbor, Staten Island, New York; *Abraham Lincoln*, in Chicago; *The Puritan*, a statue of Samuel Chapin, in Springfield, Massachusetts; the portrait-busts of *William M. Evarts*; *Theodore D. Woolsey*, at Yale; *General William T. Sherman* (1888); the statue of *Diana*, placed originally on the tower of the Madison Square Garden, New York, and in 1893 on the roof of the Agricultural Building at the World's Columbian Exposition in Chicago. He was a member of the jury of acceptance in the sculpture department of the United States fine-art exhibit at the Columbian Exposition.

LOUIS SAINT GAUDENS, a brother of Augustus, whom he assisted in his works, was born in New York, Jan. 8, 1854; studied sculpture in New York and Paris; and produced a *Faun*; a statue of *St. John* for the Church of the Incarnation, New York, and other works.

SAINT GEORGE, a town and the capital of Washington County, southwestern Utah, on the Virgin River, about 280 miles S.W. of Salt Lake City. It is the chief trade-center in the rich valley of the



AUG. ST. GAUDENS.

Virgin River. Its principal industries are a tannery and a broom factory. Population 1890, 1,134.

ST. GEORGE'S. See BERMUDA ISLANDS, Vol. III, p. 599.

ST. GEORGE'S. See GRENADA, Vol. XI, p. 184.

ST. GEORGE'S CHANNEL, a body of water connecting the Irish Sea and the Atlantic Ocean and separating the southwest of England from Ireland, extending on the eastern side from Holyhead Island to St. David's, and on the western from Dublin to Wexford. It has a length of about 100 miles, and a width varying from 50 to 95 miles.

ST. GOTTHARD TUNNEL. See TUNNELING, Vol. XXIII, p. 624.

SAINT HELENA, a town of Napa County, western central California, situated between two mountain-ranges about 50 miles N. of San Francisco, on the Southern Pacific railroad. It is surrounded by extensive vineyards, and has a large trade in wine; has also foundries, machine-shops, soda-works, and in the vicinity quarries of building-stone, coal, iron and quicksilver. Population 1890, 1,705.

ST. HELIER. See JERSEY, Vol. XIII, p. 635.

ST. HYACINTHE, a city and the capital of St. Hyacinthe County, south central Quebec, Canada, on the left bank of the navigable Yamaska River, and on the Grand Trunk railroad, 32 miles E.N.E. of Montreal. Is in the center of a rich agricultural and lumber district; has lumber-mills and manufactories of woolen goods, leather, woodenware, iron castings; has many fine buildings, including the bishop's palace and the main building of a Catholic college. Population 1891, 7,016.

ST. IGNACE, a city and the capital of Mackinac County, southeastern part of the upper peninsula of Michigan, on the Straits of Mackinac, and on the Duluth, South Shore and Atlantic railroad, of which it is the terminus; opposite Mackinaw City, and 45 miles N. of Petoskey. Has a fine harbor, making it a terminal port for several lines of steamers and a port of call for others. Principal industries are iron-mining, manufacturing, shipping of lumber and fish. In its early days St. Ignace was the seat of a Jesuit mission, and contains a church built by Jacques Marquette, the oldest in northern Michigan. Population 1890, 2,068.

ST. JEROME, a town and the capital of Terrebonne County, south-southwestern Quebec, Canada, on the North River, and branches of the Canadian Pacific and the Great Northern railroads, about 30 miles N.W. of Montreal. The North River at this point has a fall of 300 feet in 3½ miles, furnishing water-power for woolen factories, sawmills, flour-mills, etc. Iron and plumbago are found in the vicinity. Population 1891, 2,868.

ST. JOHN, JOHN PIERCE, an American publicist and Prohibitionist lecturer; born in Brookville, Franklin County, Indiana, Feb. 25, 1833; clerked for a time in a store; moved to California, where he took part in the Indian disturbances; made voyages to Mexico, South America and

Sandwich Islands; in 1860 removed to Charleston, Illinois, to study law; served in the Civil War, rising to the rank of colonel; removed to Kansas in 1869, and served in the state senate (1873-74). He was Republican governor of Kansas (1879-83), being elected on a temperance platform, and was the candidate of the Prohibition party for President in 1884.

ST. JOHN, PERCY BOLINGBROKE, an English author; born in Plymouth, March 4, 1821; a son of the Orientalist and author, James Augustus St. John (q.v., Vol. XXI, p. 173). He traveled with his father in the East, and about 1840 visited Mexico, the United States and Texas, serving for a time in the Texan army; was appointed Paris correspondent of *The North British Daily Mail* in 1847; devoted himself to literature, and was the author of numerous novels, books for boys and contributions to many magazines and periodicals. His books include *The Young Naturalist's Book of Birds* (1844); *Three Days of the French Revolution* (1848); *Book of the War* (1853), for which the Greek Parliament gave him a vote of thanks; *Arctic Crusoe* (1854); *The Snow Ship* (1865); *Good as Gold* (1875); and a *Daughter of the Sea* (1884). He died March 15, 1889.

ST. JOHN LAKE, a large, oblong-shaped body of water lying within the district of Chicoutimi, northern Quebec, about 120 miles N. of the city of Quebec. It has a length of 28 miles and a width of 25 miles; receives the waters of several large rivers, among them the Chamouchouan, the Mistassini and the Peribonka, and has an outlet to the St. Lawrence by the Saguenay River. The lake is noted for its fish, including the ouananiche or lake-salmon.

ST. JOHN RIVER. See NEW BRUNSWICK, Vol. XVII, p. 373.

ST. JOHNS. See ANTIGUA, Vol. II, p. 128.

ST. JOHNS, a town and the capital of St. Johns County, southern Quebec, Canada, 23 miles S.E. of Montreal, on the Richelieu River, and at the junction of the Vermont Central, the Grand Trunk and the Canadian Pacific railroads. Besides the manufacture of earthenware goods, which is the leading industry, it has foundries, tanneries, saw, grist and planing mills, etc., and carries on a large trade in lumber, grain and farm produce. Population 1891, 4,722.

SAINT JOHN'S, a manufacturing town and the capital of Clinton County, south central Michigan, 22 miles N. of Lansing and 98 miles N.W. of Detroit, on the Detroit, Grand Haven and Milwaukee railroad. It produces farming, implements, carriages, flour and furniture. Its factory for making tables is said to be one of the largest of its kind in the world. Population 1890, 3,119; 1894, 3,440.

ST. JOHNSBURY, a town and the capital of Caledonia County, northeastern Vermont, on the Passumpsic River, and on the Boston and Maine and the St. Johnsbury and Lake Champlain railroads, about 34 miles E.N.E. of Montpelier. It contains the Fairbanks scale factory, said to be the largest factory of its kind in the world, and

has foundries, machine-shops and manufactories of farm-implements. It is the seat of St. Johnsbury Academy, founded and endowed in the sum of \$200,000 by Thaddeus Fairbanks; possesses the St. Johnsbury Athenæum and Art Gallery, founded by Horace Fairbanks, and a museum of natural science. Population 1890, 3,857. See also ST. JOHNSBURY, Vol. XXI, p. 176.

ST. JOHN'S COLLEGE, an educational institution founded at Annapolis, Maryland, in 1789; an outgrowth of King William's School, which was started in 1696. The school is non-sectarian, and is supported almost entirely by the state, receiving therefrom about \$15,000 annually. The attendance averages about 185. There were, in 1895, 14 instructors, and the library contains some 8,000 volumes.

ST. JOHN'S RIVER, a stream rising in Brevard County, eastern Florida, and for a course of nearly three hundred and fifty miles flows in a northerly direction through the same state, emptying into the Atlantic Ocean in Duval County, about 15 miles N.E. of Jacksonville. Steamboats of large size navigate the river as far as Enterprise. For two thirds of its course it is nowhere less than a mile in width, and for a hundred miles from its mouth resembles a lagoon more than a river. It is fed by springs and the overflow of swamps, and passes through a level region abounding in orange groves.

ST. JOHN'S UNIVERSITY, an educational institution founded by Rev. Demetrius Marogua at Collegeville, Minnesota, in 1857. It was empowered to confer university degrees in 1869, and in 1878 was empowered by Leo XIII to confer the doctor's degree in theology, philosophy and canon law. In 1883 the title of university was given by act of the legislature. There were in 1895 about 250 students, 23 instructors, and the library contained about 10,000 volumes.

ST. JOHNSVILLE, a village in Montgomery County, eastern central New York, on the Mohawk River, the Erie canal, and on the New York Central and Hudson River and the West Shore railroads, about 65 miles W.N.W. of Albany, in a farming and dairying region. It has manufactories of reapers, paper, pianos and woolen goods. Population 1890, 1,263.

ST. JOHNSWORT FAMILY, the common name given to the family *Hypericaceæ*, distinguished by its opposite and entire leaves, which bear transparent and sometimes blackish dots, its numerous stamens often in clusters, and a many-seeded pod. The largest genus is *Hypericum*, represented in our flora by numerous species.

SAINT JOSEPH, a post village of Berrien County, southwestern Michigan, at the mouth of the Saint Joseph, on Lake Michigan, and on the Chicago and West Michigan and the Vandalia Line railroads, 22 miles N. of Niles and 60 miles by water N.E. of Chicago. It is engaged in the production of lumber, machinery and flour, and in shipping fruit. Population 1890, 3,373.

ST. JOSEPH, a city and the capital of Buchanan County, northwestern Missouri. (For article

giving its history until 1880, see ST. JOSEPH, Vol. XXI, p. 176). In 1893 it had 181 manufacturing establishments, employing 5,540 persons. The leading industries include manufactories of men's shirts and overalls, said to be the largest in the United States; making of harness, boots and shoes, furniture, machinery, railway-cars, plows and pumps. Among the notable buildings erected since 1880 are the United States government building, the union depot and free public library building. In addition to being a manufacturing city of note, St. Joseph is also an important shipping-center of cattle and hogs and grain, including corn, oats and wheat. The period from 1880 to 1890 was marked by a large increase in population, the number of inhabitants of the city increasing from 32,431 in the former year to 52,324 in the latter. The corporate limits in 1895 included seven square miles, and extended two and a half miles back from the river.

ST. LAWRENCE CANAL. See CANAL, in these Supplements.

ST. LAWRENCE UNIVERSITY, an educational institution located at Canton, New York. It was founded in 1856 by the Universalists, and formerly comprised three departments—the academy, the college, and the theological seminary. The academy has been dropped, and the other two, while under the same board of trustees, are entirely independent of each other, both in educational and financial affairs. Besides a campus of 27 acres with buildings and equipments, the college has an endowment fund of about \$170,000, and the seminary about \$150,000. Both departments are open to women, and together have an attendance of 180. There are 9 instructors in the college and 7 in the seminary, and about 12,000 volumes in the library.

ST. LOUIS, a town in Gratiot County, near the central part of the southern peninsula of Michigan, 8 miles N. of Ithaca, the capital of the county, and 35 miles W. of Saginaw, on Pine River, and on the Detroit, Lansing and Northern and the Toledo, Ann Arbor and Northern railroads. It is the center of a rich agricultural district, and has several well-known mineral springs, on account of which a large sanitarium was erected. There are various manufactures, including salt-works, lumber-mills, foundry, machine-shop, etc. Population 1890, 2,204.

ST. LOUIS, a city of eastern Missouri. (For general article, see ST. LOUIS, Vol. XXI, pp. 183-185.) In 1890 there were in St. Louis 336.58 miles of improved streets, 76.44 miles of paved alleys, 311.09 miles of public and district sewers. The sewer system is most extensive, surface-drainage being unknown in the city. The largest sewer, known as the Mill Creek, following the line of a natural drain, is 20 feet wide and 15 feet high. Local transit is carried on by cable and electric lines, which operate 250 miles of track, and electricity and gas furnish the means of lighting the city. The public parks in 1890 covered an area of 3,200 acres, and among the buildings of note erected since 1880 may be mentioned the new

City Hall, cost \$2,000,000, and the Union Railway station, one of the finest railroad depots in the world, having a train-shed covering 30 tracks, and costing, with the ground, \$6,500,000. The churches of the city include representatives of the leading denominations and number about 230, some of the more important ones being the Roman Catholic Cathedral, Christ Church (Protestant Episcopal), Grand Avenue Presbyterian Church, Church of the Messiah (Unitarian), First Presbyterian and the Pilgrim Congregational churches. The school census of 1893-94 showed 68,839 pupils enrolled, and income of \$1,510,945, expenditures of \$1,496,920, and buildings valued at \$2,893,749. Besides the public schools the city has numerous private and parochial schools



UNION DEPOT, ST. LOUIS.

of primary and grammar grade, besides being the seat of a large number of institutions for higher education and professional training, among them Washington University (q.v., in these Supplements), St. Louis University (Roman Catholic), Christian Brothers' College (Roman Catholic), Concordia Theological Seminary (Lutheran), Beaumont Hospital Medical College, St. Louis College of Pharmacy, St. Louis Training School for Nurses, St. Louis Law School, St. Louis School of Fine Arts, and several institutions for deaf-mutes and the blind. In 1891 there were 25 libraries of 1,000 volumes and over, having a total of 294,636 bound volumes, of which the Free Public Library contained 80,000 volumes, the Mercantile, 78,300; the St. Louis University, 30,000; the St. Louis Law School, 18,138; and the St. Louis Academy of Science, 16,000. There were in 1895, 12 daily and 61 weekly papers, besides a large number of fortnightly, monthly, bi-monthly and quarterly periodicals.

The census returns for 1890 show that the city had in that year 6,148 manufacturing establishments, with a combined capital of \$140,775,392, paying \$53,165,242 to 93,610 persons, and \$122,010,805 for materials from which were turned out products valued at \$228,714,317. The leading industries were breweries, capital \$15,910,417, products \$16,185,560; tobacco factories, \$3,894,320, products \$14,354,165; flour and grist mills, \$4,320,955, products \$12,641,000; slaughter and packing houses, capital \$3,274,671, products \$12,047,316; foundries and machine-shops, capital \$10,184,926, products \$11,945,493; men's clothing, capital \$5,765,150, products \$9,630,688;

publishing-houses, capital \$5,192,065, products \$8,551,249; car making and repairing, capital \$2,453,443, products \$5,641,252; in addition to which are manufactories of boots and shoes, carriages, furniture, gas and water pipe, white lead, oils and paints, saddlery and harness, fire-brick, retorts, bagging, sugar, glass and lumber. The city had 26 banks in 1893, with a combined capital of \$16,850,000, and whose clearings for the year aggregated \$1,139,014,291. The assessed valuation of real and personal property in 1894 was \$310,341,850. The rate of taxation, exclusive of the tax to pay interest on the bonded debt, is limited for municipal purposes to one per cent.

Owing to its splendid transportation facilities by rail and water, St. Louis is an important trade and shipping center.

The receipts of freight brought into the city by its 15 railroads and branches amounted in 1893 to 10,133,448 tons, and the shipments to 5,350,128 tons.

St. Louis is an interior port which may be entered by foreign goods without appraisement at the original port of reception, and had imports for the fiscal year ending June 30, 1893, valued at \$3,305,351. St. Louis has five bridges, three across the Missouri River and two across the Mississippi River, these latter being the Illinois and St. Louis or Eads bridge, and the Merchants' bridge, completed Dec. 31, 1889, at a cost of \$3,000,000. On the afternoon of May 27, 1896, one of the fiercest cyclones ever known in the West brought disaster upon the city of St. Louis. The storm swept through the heart of the city, wrecking many buildings; crossed the river, demolishing warehouse property and shipping and wrecking the upper works of the Eads bridge, and passed over East St. Louis, doing a vast amount of damage. The fatalities for the two cities were estimated at 388; the injured in St. Louis about 1,000, and a property loss for the latter city of from \$22,000,000 to \$50,000,000. Population 1880, 350,522; 1890, according to United States census, 451,770; according to local claim, 460,357; estimated in 1894, 595,500.

ST. LOUIS, a river. See ST. LAWRENCE, Vol. XXI, pp. 177, 178.

ST. LOUIS UNIVERSITY, an educational institution for men at St. Louis, Missouri; established



ST. LOUIS UNIVERSITY BUILDING.

in 1829, and maintained by the Roman Catholic Church. In 1895-96 there were 304 students in

attendance, 18 instructors, and a library of 43,000 volumes. The larger portion of the student body is enrolled in the preparatory department. Inclusive of the year 1895, the graduates from the foundation of the institution numbered 1,022.

ST. MARGUERITE ISLANDS. See LERINS, in these Supplements.

ST. MARTINSVILLE, a village and the capital of St. Martin Parish, central southern Louisiana, 45 miles S.W. of Baton Rouge, on Bayou Teche, and on the Southern Pacific railroad. It is in a cotton, sugar-cane, corn and rice producing region, and has a cottonseed-oil mill, cotton-gins and sugar refineries. It has direct steamboat connection with the Gulf of Mexico. Population 1890, 1,814.

ST. MARY, a village of Auglaize County, western Ohio, 22 miles S.S.W. of Lima, on the St. Marys River, the Miami and Erie canal, and the Lake Erie and Western railroad. In the vicinity are numerous natural-gas and oil wells, and a mile west of the village is the St. Mary reservoir, a feeder to the canal, covering an area of over seventeen thousand acres, said to be the largest artificial body of water in the world. The industries of the village include a spoke machine-shop, woolen-mill, chain-works, tow factory, paper-mills, carriage factory, etc. Population 1890, 3,000; 1895, 4,502.

ST. MARYS, a village and port of entry, the capital of Camden County, southeastern Georgia, about 32 miles S. of Brunswick, on the St. Marys River, at its confluence with Cumberland Sound. It has a fine harbor, admitting large vessels. The principal industry is in the sawing of lumber. Population 1890, 575.

ST. MARYS, a village of Pottawatomie County, northeastern Kansas, near the Kansas River, on the Union Pacific railroad. It has flour and lumber mills, and is the seat of St. Marys College, a Roman Catholic institution of learning for the education of young men. In the reports for 1896 it had 32 instructors, 207 students, a library of 15,000 volumes and a yearly income of \$30,000. Population 1890, 1,174.

ST. MARYS, a village of Marion County, north central Kentucky, about 5 miles W. of Lebanon and 50 miles S.S.E. of Louisville, on the Lebanon branch of the Louisville and Nashville railroad. It is in a county whose surface is hilly and in parts heavily wooded, abounding in limestone, and producing corn, oats, wheat and cattle. The village is the seat of St. Mary's College, a Roman Catholic institution for the education of young men, which in 1896 had 12 instructors, 115 students, and a library of about 4,000 volumes. Population 1890, 113.

ST. MARYS, a town of Perth County, southwestern Ontario, Canada, 22 miles N. of London, on a branch of the Thames, and at the junction of the main line of the Grand Trunk railroad with the London branch. In the vicinity of the town are limestone quarries, from which large quantities of stone are exported. Other industries include flour, oatmeal, woolen and flax mills, foundries, agricultural works and lime-kilns. Population 1891, 3,416.

dries, agricultural works and lime-kilns. Population 1891, 3,416.

ST. MARYS RIVER. See ST. LAWRENCE, Vol. XXI, p. 178; and CANALS, in these Supplements.

ST. MAURICE RIVER. See QUEBEC, Vol. XX, p. 165.

ST. MICHAEL, a post village of Talbot County, eastern Maryland, 22 miles by water S.E. of Annapolis, on a navigable inlet of Chesapeake Bay, and on the Baltimore, Chesapeake and Atlantic railroad. It has a brickyard, sawmill, ship-building industries, and many vessels engaged in the fish and oyster trade. Population 1890, 1,329.

ST. MICHAEL'S, a station on an island of the same name, in Norton Sound, off the west coast of Alaska, about 70 miles N. of the mouth of the Yukon River. It is the principal commercial headquarters for the Yukon and Arctic regions.

ST. MICHAELS. See AZORES, Vol. III, p. 171.

ST. PARIS, a post village in Champaign County, western central Ohio, 11 miles W. of Urbana, and about 50 miles W.N.W. of Columbus, on the Ohio Southern and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. It is situated in an agricultural region, and has a distillery, carriage shops and planing-mills. Population 1890, 1,145.

ST. PAUL, a city, the capital of the state of Minnesota and of the County of Ramsey. (For general article, see ST. PAUL, Vol. XXI, pp. 188, 189.) Built originally upon a series of steep terraces, St. Paul was in earlier years confined by its topography almost entirely to the first and second benches, or terraces, ascending from the river. By 1888, however, the city had spread over the wide and commodious plateaus lying east, west and north of the surrounding bluffs, and now embraces 35,482 acres. Its business center is still confined chiefly to the lower terraces, while the high plateaus that rise above them on every side are the favorite residence districts of the city. In the older portions of the city the streets are too narrow for comfort or beauty, but in the newer the thoroughfares are ample in width and laid out according to modern ideas of usefulness and sightliness. On the western bluff, known as St. Anthony's Hill, are many streets paved with asphaltum and boulevarded, which are singularly handsome and attractive, and chief of these is Summit Avenue, which for a mile or more skirts the brow of the hill overlooking the picturesque Mississippi, and is lined on both sides with handsome residences.

The principal public buildings are the State capitol, built in 1882 at a cost of about \$450,000, and to be replaced by a more imposing and costly structure; the courthouse and city-hall, completed in 1890 at a cost of little more than one million dollars; the market-house, the Chamber of Commerce building, the United States custom-house (soon to be superseded by one far larger), and a union depot. The water-supply of the city is obtained from a chain of lakes some distance to the

north. St. Paul's civic transportation facilities are excellent, and the system, many parts of which are continuous with the lines from Minneapolis, has 103 miles of electric and cable street-railway in operation.

In May, 1890, there were 40.4 miles of paved streets, with 536 miles of sidewalks, and 439 miles of graded streets. The material used for paving is granite, cedar blocks and asphaltum, the latter confined to the residence portions. The city has 38 public parks or squares, ranging in size from Como Park, with 256 acres of lawn and lake, to small breathing-places occupying less than an acre.

Seven large bridges cross the Mississippi River at St. Paul; one is in course of construction, and one to accommodate a belt-line of railroad around the city will be built within a short time. Of the seven now in use, five are for foot-passengers, teams and street-cars, and two for railways. One bridge is a novelty in architecture of this kind, in that, in a length of a little more than half a mile, it has a grade of 100 feet, the southern end being to that extent higher than the northern. The Mississippi has been partially diked on the western bank, and government appropriations are available for a system of levees which will protect many acres of ground, suitable for manufactories, railway shops and yards, from any danger of overflow.

St. Paul is the center of a large railway system, 28 lines radiating therefrom in all directions. There are 14 lines eastward and four to the Pacific Coast, with terminals at San Francisco, Portland, Tacoma, Seattle and Vancouver. During the summer months, the season of greatest travel, about three hundred passenger trains arrive and depart daily from the union depot. These railway transportation facilities, besides the location of the city at the head of navigation on the Mississippi, has made St. Paul an important receiving and distributing point for a vast region, and has brought to it a trade whose volume is constantly increasing.

The churches of the city number 167, among them being representatives of all the leading denominations. The public schools, which in 1894-95 numbered 44, including a large manual-training school and several kindergartens, had an enrollment of 19,000 pupils and expended during the year \$451,500. The parochial and private schools had an enrollment of 8,000.

The institutions for higher education include Hamline University and Macalester College (both of which, see in these Supplements), St. Paul's Seminary, and St. Thomas's Seminary, both Roman Catholic; and Concordia College (German Lutheran). There are numerous benevolent institutions, including homes, relief societies, social settlements and hospitals; and several libraries, among them the Minnesota Historical Society, 21,000 volumes; the Public, 30,000 volumes, and the State Law, 20,700 volumes.

According to the returns for 1890, reports were received from 1,442 manufacturing establish-

ments, having a combined capital investment of \$22,501,211, paying \$10,373,396 to 18,558 persons and \$15,865,573 for materials, from which products were turned out to the value of \$33,035,073. Among the most important industries are slaughtering and meat-packing, printing and publishing, the manufacture of foundry and machine-shop products, fur-goods, lumber products, malt liquors, brick and stone. The banks, 5 national, 5 savings and 12 state, have a combined capital of \$8,527,615. The assessed valuation of city property in 1894 was \$134,337,309, and the rate of taxation two mills on the dollar.

The growth of St. Paul, like that of its sister city, Minneapolis, has been remarkably rapid since 1880, when the population was but 41,473. The number increased to 133,156 in 1890, and 140,292 in 1895.

ST. PAUL, a post village and the capital of Howard County, southeastern central Nebraska, 22 miles by rail N.N.W. of Grand Island, on the Middle Loup River, and on the Burlington and Missouri River and the Union Pacific railroads. It is surrounded by a farming and stock-raising region, and has large flour-mills. Population 1890, 1,263.

ST. PAUL'S SCHOOL. See LONDON, Vol. XIV, p. 835.

SAINT PETER, an important manufacturing city, the capital of Nicollet County, southern Minnesota, on the west bank of the Minnesota River, 75 miles S.W. of St. Paul, and on the Chicago and North-Western and the Chicago, St. Paul, Minneapolis and Omaha railways. It is surrounded by timber and prairie land, and has a number of manufactories, including grist-mills, a foundry and a furniture factory. A state insane asylum, erected at a cost of \$500,000, is located here. It is the seat of Gustavus Adolphus College, a Lutheran institution organized in 1879 for the education of both men and women. In 1896 it had 16 instructors, 265 students, and a library of 9,000 volumes. Population 1890, 3,671.

ST. PETER'S, old. See BASILICA, Vol. III, pp. 415, 416. New. See ARCHITECTURE, Vol. II, p. 438.

ST. PETERSBURG DECLARATION. See INTERNATIONAL LAW, Vol. XIII, p. 195.

ST. PIERRE, a town. See MARTINIQUE, Vol. XV, p. 586.

ST. PIERRE. See REUNION, Vol. XX, p. 493.

ST. PRIVAT, BATTLE OF. See GRAVELOTTÉ, in these Supplements.

ST. REGIS FALLS AND LAKES. St. Regis Falls is a post village of Franklin County, northeastern New York, on the St. Regis River, and on the Northern New York railroad. It has excellent water-power, by means of which lumber-mills are run. Population 1890, 1,210. At the head of the St. Regis River, in the Adirondacks, are the ST. REGIS LAKES, upper and lower. They are situated in a region noted for its beautiful scenery and much frequented as a summer-resort. Neither of the lakes is large, but they are con-

nected with a network of neighboring lakes, so that one may travel through this region by boat many miles. Near the lower lake is St. Regis Mountain, having an elevation of 1,265 feet above the lake, which itself is 1,623 feet above the sea-level.

ST. ROQUE, CAPE. See ATLANTIC, Vol. III, p. 19.

SAINT-SAËNS, CHARLES CAMILLE, a French musical composer; born in Paris, Oct. 9, 1835; began to study the piano at seven; obtained the first organ prize in the Conservatoire (1851); and in the same year composed his first symphony, which was performed with success. He was the organist of the Church of St. Merri (1853), and of the Madeleine, Paris (1858-77). He composed several operas, including *La Timbre d'Argent*, *Henry VIII* (a sacred cantata), *Samson and Delila*; the symphonic poems *Phaëton*, *Le Rouet d'Omphale*, *Danse Macabre* and others, and much instrumental and orchestral music. He also wrote able musical criticisms which were published, in 1885, as *Harmonie et Mélodie*. He was elected a member of the Institute Feb. 19, 1881.

SAINTSBURY, GEORGE EDWARD BATEMAN, an English literary critic, was born at Southampton, Oct. 23, 1845, and educated at King's College School, London, and Merton College, Oxford. He graduated at the latter in 1868, and for the next ten years was engaged in educational work, filling masterships in Manchester, Guernsey and Elgin, and making a specialty in French and English literature. The subject of French literature he has particularly illuminated for English readers, while he has enriched many eras of English letters by the publication of critical works, full of lucid vigor and learning. His published works embrace a *Primer* (1880), and a *Short History of French Literature* (1882); *Specimens of French Literature, from Villon to Hugo* (1883); an edition of Corneille's *Horace* (1885) for schools; *Dryden*, in the English Men of Letters series; *Marlborough*, in the English Worthies; a *History of Elizabethan Literature* (1887); *Essays in English Literature* [1780-1860] (1891); *Essays on French Novelists* (1890); *Specimens of English Prose Style, from Malory to Macaulay* (1885); and a *Handbook of Nineteenth Century Literature* (1895). He is also the editor of a volume of *Political Verse* (1890); a selection of *Seventeenth Century Lyrics* (1891), and wrote *The Flourishing of Romance and the Rise of Allegory* (1896). He contributed forty literary sketches to this *ENCYCLOPÆDIA*, most of them concerned with French biography, of which CORNEILLE (Vol. VI, pp. 417-421), MONTESQUIEU (Vol. XVI, pp. 782-785), and RABELAIS (Vol. XX, pp. 93-98) are characteristic specimens.

ST. STEPHEN, a town and port of entry in Charlotte County, southwestern New Brunswick, Canada, 116 miles by rail W. of St. Johns, on the St. Croix River, opposite Calais, Maine, and on the Canadian Pacific and Shore Line railroads. It is the center of a lumbering district, and besides carrying on a large business in shipping lumber,

it has a cotton-mill and other manufactures. Population 1891, 2,680.

ST. THOMAS, a town and the capital of Elgin County, southwestern Ontario, Canada, 17 miles S. of London, on the Grand Trunk, the Michigan Central and the London and Port Stanley railways. It is situated in a region devoted to grain and fruit-raising, and is the seat of numerous industries, including saw, grist and flax mills, foundries, tanneries, a block-and-tackle factory, farm-implement works, breweries and others. There are also extensive car-shops of the Michigan Central railroad, employing about five hundred men. Population 1891, 10,370.

ST. UBES. See SETUBAL, Vol. XXI, p. 697.

ST. VINCENT, an island of the West Indies, one of the Windward group, 23 miles S.S.W. of St. Lucia and 100 miles W. of Barbadoes. The island extends north and south 15½ miles, has a breadth of 10½ miles, and an area of 147 square miles. It is intersected from north to south by a volcanic range of mountains, of which the principal summits are the La Soufrière, crowned by a double crater which was the scene of a great eruption in 1812, and the Grand Bonhomme. About one third of the island is under cultivation, and there is an annual trade of about \$2,500,000. The principal exports are sugar, molasses, rum, cacao, arrow-root and spices. The island was for many years neutral, but in 1763 the French agreed that the right to it should be vested in the English, who have ever since held it. The affairs of the island are administered by a governor and council of eight members. Kingston is the capital. Population of the island in 1891 (mostly colored), 41,054.

ST. VINCENT, CAPE, the extreme southwest point of Portugal, province of Algarve, in lat. 37° 1' 15" N. Noted for the naval battle which occurred off it in 1797 between the English and Spanish fleets. See NELSON, Vol. XVII, p. 322.

SAIVISM. See LAMAISM, Vol. XIV, p. 228.

SAKKARAH. See PYRAMID, Vol. XX, pp. 122, 123.

SALA, GEORGE AUGUSTUS HENRY, an English journalist and author; born in London in 1828. He was educated as an artist, and began his literary career under Charles Dickens in *Household Words*; founded the *Temple Bar* magazine, and for many years was connected with the London *Daily Telegraph*, having been its correspondent in the United States during the Civil War, in France in 1870-71, in Russia in 1876, and in Australia in 1885, and in 1892 started *Sala's Journal*. He wrote *Seven Sons of Mammon*, *Quite Alone* and *Captain Dangerous*, novels; *My Diary in America in the Midst of War* (1865); *Paris Herself Again* (1881); *London up to Date* (1894); *Things I Have Seen and People I Have Known* (1894); and many other works. He visited the United States in 1885 and lectured in several cities. He died in Brighton, Dec. 8, 1895.

SALADIN. See EGYPT, Vol. VII, pp. 753, 754.

SALADO RIO, a stream rising in the Andes, in the province of Salta, northwestern Argentine Republic, South America. It flows northeasterly

through the mountains, but on entering the plains turns southeasterly, and after a course of one thousand miles joins the Paraná in the province of Santa Fé. During a part of its course it flows through saline marshes, which impregnate its waters with salt. The river is shallow and unsuited for navigation.

SALAMANCA, a post village of Cattaraugus County, southwestern New York, on the Alleghany River, and on the Buffalo, Rochester and Pittsburg, the New York, Lake Erie and Western and the Western New York and Pennsylvania railways, 34 miles E. of Jamestown and about 60 miles S. E. of Buffalo. The lumber business, in connection with which there are a number of saw and planing mills, is the chief industry. There are also cigar factories, a wire-mattress factory, an embroidery factory and a large tannery. The machine-shops of the three railroads entering the town are located here. Population 1890, 3,692.

SALAMANDRIDA. See AMPHIBIA, Vol. I, p. 771.

SALANGA OR JUNK CEYLON. See MALAY PENINSULA, Vol. XV, p. 321.

SALAVERRY. See PERU, Vol. XVIII, p. 678.

SALDANHA, OLIVEIRA, a Portuguese chief. See PORTUGAL, Vol. XIX, pp. 553, 554.

SALE, GEORGE (1690-1736). See MOHAMMEDANISM, Vol. XVI, p. 606.

SALEM, a city and the capital of Marion County, south central Illinois, on the Baltimore and Ohio Southwestern railroad and the Chicago, Paducah and Memphis railroad, 13 miles N. E. of Centralia and about 70 miles E. of St. Louis, Missouri. It is the center of an agricultural and coal-producing region, has flour-mills, and carries on the drying of fruit very extensively. Population 1890, 1,493.

SALEM, a town and the capital of Washington County, southern Indiana, on a branch of the Blue River and on the Louisville, New Albany and Chicago railroad, about 35 miles N. N. W. of New Albany. It is in an agricultural region; has flour-mills, wagon-shops, a tannery and chair factory. In the vicinity are lime and building stone quarries, employing a large number of men. Population 1890, 1,975.

SALEM, a city and the capital of Essex County, northeastern Massachusetts, on the Boston and Maine railroad. The city has a large coasting-trade, and is the landing-place for immense quantities of coal intended for shipment into the interior. The census returns for 1890 showed 60 industries, reporting 513 establishments, having an invested capital of \$7,002,777 and a product for the year valued at \$8,522,751. Among these the chief are foundries and machine-shops, manufactories of leather, boots and shoes, cotton, white lead, jute, cars and cordage. The city has numerous churches, public, private and parochial schools, seven national banks with combined capital of \$2,000,000, two savings banks with deposits aggregating \$12,000,000, gas and electric lights, a public library of 29,000 volumes, two daily and three weekly newspapers and a monthly periodical.

Population 1890, 30,801; 1895, 34,437. See also SALEM, Vol. XXI, pp. 210, 211.

SALEM, a city and the capital of Dent County, southeastern central Missouri, on the St. Louis and San Francisco railroad. The surrounding country is devoted to agriculture, stock-raising and iron-mining. In the city there are flour, planing and saw mills. It is the seat of Salem Academy. Population 1890, 1,315; 1895 (estimated), 2,000.

SALEM, a city and the capital of Salem County, southwestern New Jersey, 14 miles S. E. of Wilmington, Delaware, and 34 miles S. W. of Philadelphia, Pennsylvania, on the navigable Salem River and on the West Jersey railroad. It has steamboat connection with Philadelphia; is the center of a rich agricultural region, and contains churches, public schools, a Friends' school, a public library two national banks, three weekly newspapers, and various industries, including canneries of fruits and vegetables, iron foundries, machine-shops and manufactories of oil-cloth, glass, hollow-ware and hosiery. Population 1890, 5,516; 1895, 6,337. See also SALEM, Vol. XXI, p. 211.

SALEM, a town and the capital of Washington County, eastern New York, on the Delaware and Hudson railroad, about 40 miles N. N. E. of Albany. It is the center of an agricultural, dairying and slate-quarrying district; has mills, a cheese factory and railway repair-shops. Washington Academy, opened in 1791, and St. Paul's Hall, opened in 1885, are located here. The town is popular as a summer-resort. Population 1890, 1,504.

SALEM, a city of Forsyth County, northwestern central North Carolina, on a branch of the Yadkin River and on the Norfolk and Western and the Southern railroads, 1½ miles S. of Winston, the county capital, and 112 miles W. N. W. of Raleigh. It was founded by the Moravians, in 1766; and during the early Indian troubles, the Revolutionary War and the Civil War, was the center of important movements. It has manufactories of woolens, cotton, tobacco, iron, etc. It is the seat of Salem Female Academy, an institution founded by the Moravians in 1802, and which, although termed "academy," has since become one of the leading colleges for women in the South. Population 1890, 2,711.

SALEM, the largest city of Columbiana County, eastern Ohio, on the Pittsburg, Fort Wayne and Chicago and the Salem railroads, 13 miles E. of Alliance and about 70 miles W. of Pittsburg, Pennsylvania. It is situated in a rich farming country, yielding grain, cattle and wool. Coal is also produced. The city has large manufactories of engines, pumps, wire nails, stoves, organs and labels. Population 1890, 5,780.

SALEM, a city and the capital of Oregon and of Marion County, in the northwestern part of the state, 52 miles S. of Portland, on the Willamette River, and on the Southern Pacific railroad. It has communication with Portland by both rail and water, and since 1880 has become an im-

portant manufacturing center, the leading industries being flour and woolen mills, fruit-drying and canning establishments, carriage and wagon factories, foundries and machine-shops, tanneries, brick-kilns, tobacco factories and agricultural-implement works. The city has public parks, numerous churches, primary, grammar and high schools, a state, masonic and other libraries, several reformatory and charitable institutions, 5 banks, 3 daily and 4 weekly newspapers and a monthly periodical. Among the institutions of learning located here are a Friends' Institute, opened in 1892, and Willamette University (Methodist Episcopal), a co-educational institution, established in 1843. In 1896 it had 59 instructors, 404 students and a library of 6,686 volumes. Population 1890, 4,515; 1895, 10,261. See also SALEM, Vol. XXI, p. 211.

SALEM, a post village and the capital of Roanoke County, southwestern Virginia, on the Roanoke River, and on the Norfolk and Western railroad, which connects it with Lynchburg, sixty miles to the eastward. It is the center of an agricultural and tobacco-raising district, has good water and several industries, including tanneries, tobacco, chair, and carriage factories. There are medicinal springs in the vicinity, making the place a resort for Southern people. It is the seat of Roanoke College (q.v., in these Supplements). Population 1890, 3,279.

SALE OF INTOXICATING LIQUORS, LAWS REGULATING. See LIQUOR LAWS, in these Supplements.

SALERATUS, a name formerly given to acid potassium carbonate (bicarbonate of potash), and now almost exclusively used for the corresponding sodium salt, extensively used in baking-powders and in medicine.

SALIANS. See FRANKS, Vol. IX, p. 723.

SALICACEÆ. See WILLOW, Vol. XXIV, p. 588.

SALFORD, a municipal and Parliamentary borough of Lancashire, separated by the river Irwell from Manchester, of which city it virtually forms a part, although possessed of separate and distinct jurisdiction. The population of the county borough in 1896 was 198,139; that of the civil parish, 109,732. Salford contains three Parliamentary divisions—north, south and west—each of which returns one member. By the new Manchester ship canal it is now in connection with Liverpool and the sea. It forms one of the residential suburbs of Manchester, contains the Peel Park Museum, and in parts presents, from its higher ground, a fine view of manufacturing Manchester and its myriad tall chimneys. The huge docks of the Manchester ship canal are located in Salford. See MANCHESTER, Vol. XV, p. 459, and in these Supplements; and also CANAL, in these Supplements.

SALIDA, a city of Chaffee County, western central Colorado, near the Arkansas River, on the Denver and Rio Grande railway, 97 miles W. of Pueblo. It is the center of a district devoted to farming, grazing and mining, the principal ores

produced being silver, iron and copper. There are quarries of marble, onyx and limestone in the vicinity. The city contains the Rio Grande General Hospital, Salida Academy and large railway shops. Population 1890, 2,586; 1895 (estimated), 3,200.

SALIENTIA, a name given by certain authors to the order of amphibians which contains the toads and frogs. The term is synonymous with *Anura*, this name being the one commonly applied to the tailless amphibians. It is also equivalent to *Batrachia* in the restricted sense of that term. The name is not often used by recent authors. The name has also been applied to an order of mammals containing the kangaroos and similar forms.

SALINA, a city and the capital of Saline County, Kansas, on Smoky Hill River, about sixty miles from its mouth, 47 miles W. of Junction City and 39 miles E. of Ellsworth. It is also at the junction of the Union Pacific, the Missouri Pacific, the Atchison, Topeka and Santa Fé and the Chicago, Kansas and Nebraska railroads, making it one of the most important railway centers in that portion of the state, accessible from all directions. It has flour-mills, carriage works, broom and mattress factories, a foundry and machine-shop. In the vicinity there are salt springs and gypsum quarries. It is the seat of Salina Normal University and Kansas Wesleyan University, the latter a Methodist co-educational institution, founded in 1886. In 1896 it had 19 instructors, 305 students, a library of 5,200 volumes, and productive funds amounting to \$35,000. Population 1890, 6,149; 1895, 5,703.

SALINAS, a city and the capital of Monterey County, western California, about 95 miles S.E. of San Francisco, on the Southern Pacific railroad. It is the center of trade for a fertile valley devoted to agriculture, stock-raising and wool-growing, and has several factories. Population 1890, 2,339; 1895 (estimated), 3,500.

SALINEVILLE, a post village of Columbiana County, eastern Ohio, on the Cleveland and Pittsburgh railroad, 30 miles S.S.E. of Alliance and about 70 miles W.N.W. of Pittsburgh, Pennsylvania. In addition to coal-mining, which is the principal industry, there are flour-mills, potteries and brick-works. The surrounding country is given largely to agriculture. Population 1890, 2,369.

SALINOMETER. See HYDROMETER, Vol. XII, p. 542.

SALISBURY, a post township in Litchfield County, northwestern Connecticut, organized in 1740; on the Housatonic River, and on the Philadelphia, Reading and New England railroad, about 65 miles W.N.W. of Hartford. The township contains the villages of Salisbury, Lakeville, Lime Rock, Chapinville and Ore Hill. Its surface is diversified by valleys, lakes and hills, presenting beautiful scenery. Within the township there are beds of hematite iron-ore, an iron-foundry, woolen-mills, a machine-shop of the Housatonic railroad, blast-furnaces and cutleries.

The Connecticut School for Imbeciles is located here. Population 1890, 3,420.

SALISBURY, a post village and the capital of Wicomico County, southeastern Maryland, on the navigable Wicomico River, and on the New York, Philadelphia and Norfolk and the Baltimore, Chesapeake and Atlantic railroads, 32 miles N.N.E. of Crisfield. The surrounding district produces grain, fruit and lumber, of which large quantities are exported. The village has an academy, planing-mills and flour-mills. Population 1890, 2,905.

SALISBURY, a city and the capital of Rowan County, western central North Carolina, at the junction of branches of the Southern railroad, 44 miles N.N.E. of Charlotte. It is the center of an agricultural and mining region, and the seat of Livingstone College and of a state normal school, both for colored pupils. The former institution, chartered by the African Methodist Episcopal Church in 1879, had in 1890 a corps of four instructors and a total in all departments of 248 students. The city has iron foundries, a car-shop and manufactories of cotton, woolen goods and tobacco. Population 1890, 4,418.

SALISBURY, ROBERT ARTHUR TALBOT GASCOIGNE CECIL, MARQUIS OF, an English statesman; was born at Hatfield, Herts, Feb. 13, 1830. He was educated at Eton and at Christ Church, Oxford, where he graduated, and was elected a fellow of All Soul's College. In 1853 he was elected M.P. for Stamford, and represented that borough in the Conservative interest until his succession to the marquissate, April 12, 1868. While in the lower



MARQUIS OF SALISBURY. house he was known as Lord Robert Cecil, until June 14, 1865, when he assumed the courtesy title of Viscount Cranborne. In Earl Derby's third administration he was, in July, 1866, appointed Secretary of State for India, which post he resigned on account of a difference in opinion respecting the Reform Bill, March 2, 1867. He was again appointed Secretary of State for India, when Mr. Disraeli returned to office in February, 1874. When, at the close of the war between Turkey and Serbia, differences arose between the former power and Russia, the Marquis of Salisbury was sent as special ambassador to the Porte, and he and Sir Henry Elliot acted as joint plenipotentiaries of Great Britain at the conference of Constantinople. On April 2, 1878, he became Secretary of State for Foreign Affairs, and clearly enunciated the policy of the English government with regard to the Eastern question. He and the Earl of Beaconsfield soon afterward were the representatives of Great Britain at the congress of Berlin. He went out of office with his party after the defeat they sustained at the general election of April, 1880. At a meet-

ing of Conservative peers, held on May 9, 1881, after the death of Lord Beaconsfield, the Marquis of Salisbury was elected to lead the party in the House of Lords. Since then his career has been identified with that of the Conservative party. He opposed, but finally accepted, the Irish Land Act of 1881; vigorously criticised Mr. Gladstone's Egyptian policy; carried the rejection of the County Franchise Bill in 1884; represented the Conservatives at the conference between the opposing leaders, which led to the framing of the Redistribution Bill of 1885. On June 9th of that year Mr. Gladstone was beaten on a budget vote and resigned, and Lord Salisbury took office as premier. The principal events of his short tenure of power were the annexation of Burma, and the reopening of the Eastern question by the revolution in Eastern Roumelia and the Servo-Bulgarian War, England supporting Prince Alexander of Bulgaria by her "friendly" neutrality. After the general election of November, 1885, Lord Salisbury resigned without meeting Parliament. He vigorously opposed Mr. Gladstone's home-rule policy, and after the second general election, in 1886, became once more Prime Minister. He introduced a bill in the House of Lords in 1888 for the reform of that assembly and the creation of life peers. He resigned in 1892 after the Conservative defeat in the general election. He came into power again June 26, 1895, being called to form a Conservative cabinet on the defeat of Lord Rosebery's government in the House of Commons.

Lord Salisbury was an occasional contributor in his younger days to the *Quarterly Review*. Amid the cares of public life he found relaxation in chemical and physical research, and his work in his Hatfield laboratory was worthy of a professional hand. Queen Victoria, during the jubilee year of her reign, went in person to visit Lord Salisbury at Hatfield, who, besides being one of the social grandees of the nation, has been the leading Conservative statesman in England since the death of Lord Beaconsfield. He was elected chancellor of the University of Oxford in 1869, and warden of the Cinque Ports in 1896.

SALISBURY, ROBERT CECIL. See **CECIL**, Vol. V, pp. 282, 283.

SALIVA. See *Alimentary Canal*, under **NUTRITION**, Vol. XVII, pp. 669-673.

SALIVATION. See **MERCURY**, Vol. XVI, p. 35.

SALMON, a fish of the genus *Salmo*; is found in all the northern parts of America, Europe and Asia. The natural home of the salmon is about the mouths and estuaries of great rivers, and it cannot be stated as belonging exclusively to either the marine or the fresh-water fishes. Owing—as it is supposed—to the fact that the fish obeys a natural instinct to return, in the spawning-season, to its own birthplace, the salmon annually ascends in the summer to the head of the rivers, where the eggs are deposited in furrows which the female digs in the gravel. After remaining here for some weeks, the salmon, both

male and female, return to the sea. For an extended account of the spawning and the migrations of the salmon, and for the various species, see SALMONIDÆ, Vol. XXI, pp. 224, 225.

The strength of this migratory instinct is so great that scarcely any obstacle, such as rapid and waterfall, prevents the salmon from ascending in vast, almost countless shoals. Salmon have been seen to leap a vertical fall 16 feet in height; and when, at times, the fish falls short by one or two feet of leaping the entire distance, it is able to remain suspended in the falling water and to clear the balance of the space by a switch of its tail. Nothing is known of the life of the salmon in the open sea, but their growth while there is so rapid that they have been known to increase within a few months from a weight of 2 ounces to from 6 to 10 pounds. It has been known to reach over 100 pounds in weight, but the average is not higher than 15 to 25 pounds. In their migrations from the sea to the spawning-grounds the salmon are taken in incredible numbers. A writer, in describing these shoals of salmon in the Fraser River of British Columbia, says: "At certain times the river is almost choked with the salmon forcing their way to the upper waters. They are so numerous that it seems as though one could walk across on their backs."

On the Pacific Coast of America there are five species, which are collectively called "Pacific salmon"; and they form the genus *Oncorhynchus*. One of these, the hump-backed salmon, *O. gorbuscha*, weighs 3 to 6 pounds, and ranges from Alaska to the Sacramento River. Another, the dog-salmon, *O. lagocephalus*, ranges nearly as far south, and reaches 12 pounds in weight. Another, the silver salmon, *O. kisutch*, attains to 8 pounds, but is of small economic value. The blue-back salmon, *O. lycaodon*, reaches a weight of 8 pounds, and is abundant in the Columbia and its tributaries. It comes from the sea with a beautiful bright-blue back and silvery sides; but the males, when they return toward the ocean, are of a red color, and are called "red-fish" by the river-men. This fish ranks second in value among the Pacific Coast salmon.

The first place is held by the quinnat or king-salmon, *O. quinnat*, the largest, most numerous and most important of the Pacific Coast salmon. It frequently reaches a weight of from 80 to 100 pounds, and enters in large numbers into the Sacramento River, but is far more abundant in the Columbia and the rivers still farther north. About thirty million pounds of salmon have been annually taken in the Columbia River alone. Extensive canneries have been erected along the Columbia and other Pacific Coast rivers, wherein the fish are preserved for shipment. The fish are first cleaned and washed, after which they are placed in vats of salted water, where they are allowed to remain long enough to thoroughly cleanse. Their tails, fins and heads are removed, and they are cut by machinery to the exact necessary size to fill the cans. The cans are filled with the raw fish, along with the brine; after

which the cans are soldered up and lowered by machinery into steam-boilers at a temperature of 240°, where they are cooked for an hour. After removal a hole is punched in each can to allow gas to escape, after which it is quickly soldered again. The cans are then subjected to a second cooking, after which a spray of cold water is thrown over them. If the can is swollen it is rejected; if the sides hollow in as it cools, it shows that a vacuum exists and the can is perfect. Columbia salmon are exported to all parts of the world.

As the fish run up-stream they are taken in seine and pound nets, gill-nets, various trap-contrivances and fishing-wheels. (The seine-net is described under the head of *Trawl*, in the article on FISHERIES, Vol. IX, pp. 244-248.)

Pound-nets are arranged with a long, straight stretch of upright net for a leader, by which the fish are guided at length into a sort of pound or net inclosed on all sides, where they keep swimming around always in the same direction without being able to find the exit. The gill-net is a net with large meshes, which admit only the heads of fish of a certain size. In trying to pass through the meshes the fish are caught and held by the gills. Both these nets, as well as the fyke-net (somewhat similar to the pound-net), are set in the water by driven stakes. One of the most ingenious devices is the fishing-wheel. Only rivers with swift currents are available for its use, but in the Columbia and other Pacific Coast streams it is most effective. It consists of a large water-wheel of the under-shot pattern, provided with large wire scoop-nets which face down-stream. These wire baskets seize the fish as they come swimming up-stream; the revolving wheel lifts them from the water and tumbles them out upon an inclined chute, through which they slide into a receptacle. The total Pacific Coast salmon fisheries in 1889 reached 110,913,702 pounds, with a value of \$3,458,006, of which California, Oregon and Washington provided nearly three fourths, and Alaska the balance. Besides this, the Fraser and other British Columbian streams furnish an enormous supply, which, taken altogether, threatens to extinguish the supply within a short time unless the United States Fish Commission shall succeed in replenishing the rivers through its strenuous efforts at restocking them by artificial means. For a description of the methods of artificial propagation of salmon and other fishes, see PISCICULTURE, Vol. XIX, pp. 128, 129. For the *Game-Fishing* of salmon, see ANGLING, Vol. II, pp. 39-41.

SALMON, GEORGE, an Irish clergyman and mathematician; born in Dublin, Sept. 25, 1819. He graduated in 1839 as senior moderator at Trinity College, Dublin; was chosen a fellow of the college in 1841; regius professor of divinity in 1866, and provost of Trinity College in 1888. His mathematical works on *Conic Sections*; *The Higher Plane Curves*, *Geometry of Three Dimensions*, and *Modern Higher Algebra* have been translated into several languages and obtained for him

the doctor's degree from both Oxford and Cambridge universities and a fellowship in the Royal Society. His religious works consist of three series of *College Sermons* (1861, 1873, 1881); *Reign of Law* (1873); an *Introduction to the New Testament* (1885); and *Infallibility of the Church* (1888).

SALMONEUS, King of Elis. See GUNPOWDER, Vol. XI, p. 316.

SALMON-TROUT. See SALMONIDÆ, Vol. XXI, p. 222.

SALOL, a drug of comparatively recent introduction into the pharmacopeia. It is a compound, white, crystal ($C^{18}H^{10}O^5$), obtained from salicylic and carbolic acids in the proportion of six to four; is a substitute for salicyclic acid; acts internally as an antiseptic; used sometimes in rheumatism, cholera and fermentive troubles of the alimentary canal.

SALONA. See SPALATO, Vol. XXII, p. 366.

SALPAIDÆ. See TUNICATA, Vol. XXIII, p. 616.

SALSAFY, OYSTER-PLANT OR VEGETABLE OYSTER. See HORTICULTURE, Vol. XII, p. 287.

SALT. (For general article on salt, its manufacture, and various uses, see SALT, Vol. XXI, pp. 228-234.) In the United States there is almost an inexhaustible supply of salt, most of which is taken from salt springs, while many places on the coast offer facilities for its production. The product from subterranean brines in 1890 was 40,431,148 bushels; from lakes or natural deposits, 10,538,011 bushels; from seas or bays, 1,065,141 bushels. Salt is produced in fifteen states, but about sixty-seven per cent of the whole product comes from Michigan and New York, as can be seen from the following table, which is compiled from the census of 1890:

UNITED STATES AND TERRITORIES.	NUMBER OF BUSH- ELS OF SALT MAN- UFACTURED.	PERCENTAGE OF TOTAL PRODUCT.
United States.....	52,034,300	100.00
Michigan.....	18,645,553	35.83
New York.....	16,131,251	31.00
Kansas.....	5,703,995	10.96
Utah.....	3,132,143	6.02
Ohio.....	2,047,569	3.94
West Virginia.....	1,427,306	2.74
California.....	1,276,641	2.45
Pennsylvania.....	862,000	1.66
All others*.....	2,807,842	5.40

The reason that more salt is not produced in the United States is chiefly because of the great amount and cheapness of production of the article in England, and because large quantities are brought over in vessels as ballast. The principal expense in salt manufacture is the cost of fuel, and this furnishes one reason why Michigan takes first rank as a salt-producing state. For, aside from the excellent quality of the brine, they are able to secure cheap fuel by using saw-dust and other refuse from saw-mills, including the exhaust

* Illinois, Kentucky, Louisiana, Massachusetts, Nevada, Texas and West Virginia.

steam. The principal wells in this state are near Saginaw Bay.

In Nevada, salt is chiefly obtained from salt lakes, while in Arizona there is one lake which dries up each year and leaves a remarkably fine deposit of salt, which settlers haul away in wagons.

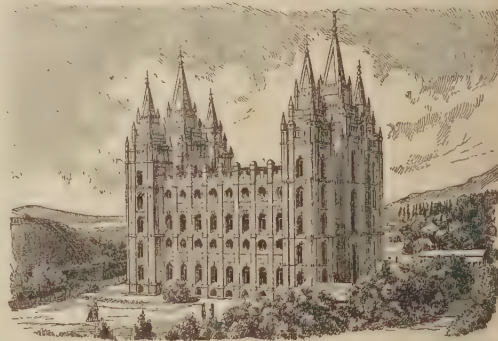
Salt wells average in depth from 1,000 to 1,900 feet.

Rock-salt is mined in four states, but the quantity produced is relatively unimportant, although it increased from 312,000 bushels in 1880 to 7,066,000 in 1890. The most important mine is on Avery's Island, in the Gulf of Mexico, where about one million bushels were produced in 1890.

SALT CREEK OR RIVER, a stream in northern Kentucky, noted for its tortuous, winding course. After flowing about 150 miles it joins the Ohio, 17 miles S. W. of Louisville. The derivation of the phrase "sent up Salt River" or "rowed up Salt River," as applied to a defeated political party, has been variously explained, one of the best explanations placing the origin of the phrase in 1832, when Henry Clay, candidate for President, having an engagement to speak in Louisville, Kentucky, hired a boatman, who turned out to be a Jacksonian Democrat, to row him up the Ohio River. The boatman, pretending to lose his way, rowed Clay up Salt River instead, so that the latter did not reach his destination till the next day—just in time to hear of his defeat.

SALT LAKE. See UTAH, Vol. XXIV, pp. 19, 20.

SALT LAKE CITY, a city of Utah. Salt Lake City in 1890 was the center of five railroads, the Great Salt Lake and Hot Springs, the Rio Grande Western, the Salt Lake and Los Angeles, the Union



MORMON TEMPLE, SALT LAKE CITY.

Pacific and the Utah Central. Since 1880 two notable buildings have been completed: the city and county building, completed in 1894 at a cost of \$900,000, and the Great Temple, a massive structure of granite, 40 years in course of construction, estimated to have cost not far from \$12,000,000, completed April 6, 1892, and formally dedicated just one year later, on the sixty-third anniversary of the organization of the Mormon church. The Temple is one of a group of buildings, including the assembly hall and tabernacle, occupying a tract of ten acres in the heart of the

city, and the building from beginning to end was the work of Mormons. It has an extreme length of 186½ feet, a width of 99 feet, and with the towers covers an area of 21,850 square feet. The loftiest tower is 222 feet 6 inches high, 26 feet square at the base, and is surmounted by a statue, 12 feet in height, of the angel Maroni. The figure is of hammered copper, plated with gold leaf. The first and second floors of the building contain the ceremonial rooms of the Mormon church, and the upper floor contains an assembly-room with a seating capacity of about three thousand.

The growth of the city since 1880 has been rapid, and since that time the strength of the non-Mormons, or Gentiles, has steadily increased, until in 1890 they gained control of the municipal government. The city is the center of mining interests for Utah and the neighboring states, and is the trade and shipping-center of a region made rich in agricultural production by irrigation. The returns of 1890 showed 45 industries, capitalized at \$2,658,676, and having a product valued at \$3,864,402. Among these industries the chief are planing, paper, flour and woolen mills, foundries and machine-shops, tannery, breweries, sampling-mills and smelting-works. The city has gas and electric lights, is traversed by horse-car lines and electric street-railways, contains churches representing the leading denominations; has good public schools, several libraries, 4 daily, 3 semiweekly, 10 weekly, 2 semimonthly and 5 monthly periodicals. The assessed valuation of city property in 1894 was \$35,000,000, and the tax-rate 6½ mills. Salt Lake City is the seat of the University of Utah (non-sectarian), a co-educational institution, supported by the state, and in 1893 granted by Congress the Fort Douglas reservation as a site for buildings. The university, which was founded in 1850, had in 1895-96 39 instructors, 500 students, and a library of 15,000 volumes. Population 1880, 20,768; 1890, 44,843; 1895, 48,076. See also SALT LAKE CITY, Vol. XXI, p. 235.

SALTO, a town and the capital of the department of Salto, northwestern Uruguay, on the Uruguay River, at the head of navigation for large vessels, opposite Concordia in Argentine Republic, and on the Northwestern Uruguay and the Central Uruguay railroads, by which it is connected with Montevideo, about 250 miles to the southeast. It is the center of a rich grazing district, and is the shipping-port for a large surrounding territory. Population 1890, 10,000.

SALTONSTALL, SIR RICHARD, an American colonist; born in Halifax, England, 1586. He emigrated to Massachusetts as assistant governor to Winthrop in 1630; was associated in the founding of Watertown in 1630; went back to England the next year, and did not return to Massachusetts; befriended the Massachusetts Bay Colony, and was a patentee of Connecticut. He died in England in 1658.—His great-grandson, GURDON SALTONSTALL, governor of Connecticut; born in Haverhill, Massachusetts, March 27, 1666. He

was graduated at Harvard in 1684, studied theology, and on Nov. 19, 1691, was ordained clergyman of New London, Connecticut. In 1709 he introduced the first printing-press in Connecticut, influenced the building of Yale College at New Haven instead of Hartford, and later took the principal direction of its affairs. He was annually chosen governor of the state from 1707 until his death in New London, Connecticut, Sept. 20, 1724.—His nephew, RICHARD SALTONSTALL, a jurist; born in Haverhill, Massachusetts, June 24, 1703. He graduated from Harvard; represented Haverhill in the general court in 1728; was a member of the council; and from 1736 till a short time before his death was a judge of the superior court. In 1737 he was chairman of a commission to settle the boundary between Massachusetts and New Hampshire. He died Oct. 20, 1756.—His grandson, LEVERETT SALTONSTALL, a lawyer; born in Haverhill, Massachusetts, June 13, 1783. He graduated at Harvard in 1802; practiced law in Salem; was state senator in 1831; mayor of Salem in 1836; member of Congress from 1838 to 1843; and was at different times speaker of the lower house in the legislature and president of the state senate. He died in Salem, May 8, 1845.

SALT RANGE or KALABAGH MOUNTAINS. See PUNJAB, Vol. XX, p. 108.

SALT RHEUM, a vague and popular term in the United States, applied to all non-febrile cutaneous affections except ringworm and itch, especially of the eczematous and herpetic forms. The term is not now used by physicians, nor is it found in modern medical dictionaries. See SKIN DISEASES, Vol. XXII, pp. 122, 123.

SALTS. See CHEMISTRY, Vol. V, pp. 486, 487.

SALTUS, EDGAR EVERTSON, an American author; born in New York City, June 8, 1858; studied at Paris and in Germany, and in 1880 graduated at Columbia College Law School. He wrote a good biography of Balzac (1884); a history of pessimistic philosophy—*The Philosophy of Disenchantment* (1885), and *The Anatomy of Negation* (1886)—both treated with a curious whimsical briskness and humor; *Love and Lore* (1890), a collection of essays; and a series of somewhat erotic novels, which include *Mr. Incoul's Misadventure* (1887); *Eden* (1888); *The Truth About Tristram Varick* (1888); *The Pace That Kills*; *A Transaction in Hearts* (1889); *Madam Sapphira* (1893); and *When Dreams Come True* (1895).

SALTUS, FRANCIS SALTUS, an American author; born in New York City, in 1849, and educated at Columbia College and abroad. He was a voluminous writer, publishing much poetry and numerous magazine articles, in his own and other tongues. He was also an accomplished



EDGAR E. SALTUS.

musician, and composed four comic operas. His works include comic histories of the United States, Germany, England and Rome; *Kings of Song*; *Great Baritones*; and *Romance of the Opera*, in prose; and the following volumes of poetry: *Honey and Gall*; *Flask and Flagon*; *Pastels and Profiles*; *Moods of Madness*; and *The Witch of Endor* (1889); and *The Bayadere, and Other Sonnets* (1894), the last two works published posthumously. He died June 24, 1889.

SALVADOR, REPUBLIC OF. (For general article, see **SALVADOR**, Vol. XXI, pp. 268, 269.) The area of the republic is estimated at 7,225 English square miles, divided into 14 departments. The population according to a census of Jan. 1, 1886, was 651,130, giving an average of 89 inhabitants to the square mile, being twenty times that of the average of the other states of Central America. An official estimate for 1894 made the population 803,000. Aboriginal and mixed races constitute the bulk of the population, among whom live about 20,000 whites or descendants of Europeans. The capital is San Salvador, founded in 1528, with 20,000 inhabitants in 1891. The city has often been destroyed by earthquakes and volcanic eruptions, the last time on April 16, 1854, when it was overwhelmed by almost total ruin, in consequence of which most of the inhabitants erected new dwellings on a neighboring site, at present called Nueva San Salvador. The new capital again was partly destroyed in 1873 by a series of earthquakes and eruptions, and suffered again severely in 1879.

GOVERNMENT. The constitution proclaimed in 1864 and modified in 1880, 1883 and 1886, vests the legislative power in a Congress of 70 deputies, 42 of whom are proprietors. Election is for one year, and suffrage is universal. The executive power is in the hands of a President, whose tenure of office is limited to four years and who is assisted by a ministry of four members.

In 1895 the republics of Honduras, Nicaragua and Salvador united to form the greater republic of Central America, to be known as Republic of Central America, when Guatemala and Costa Rica accept the agreement. The governments signing do not renounce their autonomy and independence for the direction of internal affairs.

EDUCATION AND JUSTICE. Education is free and obligatory. In 1893 there were in Salvador 585 primary schools, with 29,427 pupils; 18 higher schools (including two normal and one polytechnic school), with 1,293 pupils; and a national university with faculties of jurisprudence, medicine, natural sciences and engineering, attended by 180 students. In the capital is a national library and museum, and in the republic 13 newspapers are published. Justice is administered by the supreme court of justice, by several subordinate courts, and by local justices.

INDUSTRY. The population is largely employed in agriculture, and produce chiefly coffee, indigo, sugar and tobacco. But they also produce gold, silver, copper, iron, mercury and coal. The following shows the state of commerce:

	1890.	1894.
Imports-----	\$2,405,202	\$2,171,000
Exports-----	7,578,734	6,611,000

In 1894, 234 vessels entered the ports. Railroads are being built. The republic has been a member of the Postal Union since 1879. In 1893, there were 140 telegraph stations and several telephone stations.

FINANCE. The revenues, largely from custom and excise duties, and expenditures are shown by the following table:

	1890.	1894.
Revenues-----	\$4,151,457	\$8,818,000
Expenditures-----	5,442,315	8,569,000

The national debt, internal and external, is placed at about \$12,200,000. The country has been on a gold standard since 1892, and the unit piece is the dollar, worth about 75 cents in United States money. The metric system was introduced in 1885.

SALVATION. See **PAUL**, Vol. XVIII, pp. 425-427; and **BUDDHISM**, Vol. IV, p. 428.

SALVATION ARMY, a religious missionary organization that began in 1865, in London. It was founded by William Booth (q.v., in these Supplements) and his wife, who started out from the Methodist New Connection to reclaim the neglected and degraded. They organized their work in the east end of London, and named it the "Christian Mission." He had found small encouragement for his evangelism in the churches, and the usual methods of revivals, committees, conferences and organizations seemed to fail of their purpose until the military idea was, to use his phrase, revealed to him. Working on the lines of Primitive Methodists, Booth gathered about him many earnest converts, drawing some of them from gin-palaces and the haunts of extreme depravity. The work made friends among the upper and middle classes, who became, in particular, supporters of Mrs. Booth. It was in 1878 that the mission was reorganized on its military model, and with Mr. Booth designated as general, it took the name of "Salvation Army." This expedition attracted immediate attention, and some applauded while others opposed. The army had to fight its way to peaceable recognition, for its street meetings, both in European and American cities, were broken up at times by the police and the leaders put in jail or fined; although nowhere was this sort of opposition protracted.

While the fatigue uniforms of the men, the blue blouses, poke-bonnets with red trimmings of the women, the street parades with banners and the sound of timbrels, drums and songs on the highways arrested passers-by and drew crowds to hear the preacher, there was a deeper significance in the military system. The absolute authority of the general and the required subordination of his officers and the rank and file of the army have

brought to it the efficiency of disciplined organization. Perhaps here, too, will be found the most serious menace to the perpetuity of the mission. How long the will of the commander-in-chief will be respected as to questions of faith, as well as to the control of the soldier's service, remains to be seen; but from the beginning all authority has been his.

In doctrine the army holds to the simplest tenets of evangelicism, and is more mystical than dogmatic. It holds that the work of Jesus is the sole and universal expiation of sin; that its virtue is appropriated by faith; that the Bible is a book of plenary inspiration needing no glasses, and having its best interpretation by simple and godly hearts; that sanctification may be fully received by the believer by faith, and consciously; that religion issues in a pure and self-denying life. Sacraments there are none, yet there is nothing to hinder a soldier of the army from seeking them elsewhere, although membership in churches is not encouraged—rather, the reverse, it is gently discouraged. Infants are publicly dedicated to God and the army; marriages are public contracts, solemnized, where the law of the land permits, "under the flag," each pledging the one not to hinder the other in the service of the army. Admission to the army comes with signing "the articles of war," which involves a profession of love to God and faith in Christ, and promises to live for God and the army and to obey all lawful orders. It is this solidarity of organization with its constantly stimulated *esprit de corps*, that makes safe a large degree of freedom in thought and spiritual life that the soldier enjoys, but everywhere loyalty, devotion to the service, enthusiasm, glad obedience are expected, and also obtained to a remarkable degree. Service is voluntary, and one may withdraw from it at pleasure. There is no pay regulation, and those who give all their time are guaranteed only enough for a frugal support.

In the army, sex is allowed to work no distinction of rank, duty or opportunity. "There is neither male nor female, for ye are all one in Christ Jesus." The women exhort, lead meetings, parade, explore slums, sell the *War Cry* on street or in rum-shops, hold rank from corporal to commander of a country—and the men can do no more. Neither is the least preference shown to them. Each does that that each can do best. All are to engage in working for the salvation of sinners, so long as there is one living unreclaimed.

The characteristic dress is not uniform, but has adaptations to the customs of a country. It is the same in Great Britain and the United States. In India it is a white garment, patterned there, as everywhere, after the costume of the common people.

Barracks is the name of the place where meetings are held, and it is no small part of parades and street demonstrations to induce people to follow to the barracks. These places are generally hired rooms in populous but obscure parts of the city, and in truth, thus far, most of the

work of the army is done in cities, although it has horseback brigades for use in rural districts.

The society is intensely religious and evangelizing, and its distribution follows this conception. In its grand propaganda it divides the world into its military jurisdiction. Each country is mapped out into districts under the care of an officer, usually called a major. His subordinates are captains and lieutenants, in charge of cities and towns. Large divisions are of higher commanding grade.

The property of the society is entered on a deed-roll, under the control of the general of the army, though he is credited with never drawing his income from it. Indeed, the people who compose the army are generally humble people, though they have the same sympathy that was given in the middle ages to the Franciscans. The income is derived from sales of publications, from contributions made at barrack-meetings, from friends, from an annual day of abstinence, corresponding to Lent, and from what may come from associates of the army, who are organized into a subsidiary corps.

In 1880 the army opened its operations in France. The same year it sent six "Hallelujah Lasses" to Castle Garden, in New York, who went thence to Harry Hill's slum, on the East Side, under the direction of G. S. Rialton. This scheme was reinforced the next year by the expedition of Major T. E. Moore, who began his work in Philadelphia. In 1883 he secured an act of incorporation for the society, and thus prepared the way for a separation, under Ballington Booth, of an American branch, "The Volunteers," from the parent society. Moore was succeeded first by F. Smith, and in 1887 by Ballington Booth, who married Maud Charlesworth, and who was born about 1858, and had been a principal of a London training-school, an inspector of the army around the world. In 1896 he separated from the parent society, for reasons not yet made plain, to organize "The Volunteers." It is understood that he wished a greater freedom of movement, corresponding to the democratic organization of American society, more local self-control and a less social restriction to classes.

At the time of this first separation the Booth family, either by direct descent or by marriage, stood in the following relation to the army: "Commander and Mrs. Booth-Tucker succeeded to the oversight of the army in this country. Commander Booth-Tucker was formerly a magistrate in her Majesty's service in India, and is a man of considerable experience with the natives of that country. His wife, Emma Booth-Tucker, is the second daughter of General Booth, and is a woman possessed of some platform ability and considerable experience in army work. The rest of General Booth's family are: William Bramwell, the eldest son, who assists his father and is the chief executive in London; Herbert Howard, the third son, who is in command of Australia;

Catherine, the eldest daughter, in charge of the work in Belgium; Eva, the third daughter, in Canada; and the youngest daughter, Lucy, in France."

At the time of this separation from the old movement the disposition of forces was as follows in the United States: Five hundred and thirty-two corps, 2,011 officers, 17,269 soldiers, 3,262 recruits, 6 rescue homes, 25 training-garrisons, 3 food and shelter depots; *War Cry* (weekly organ), a combined circulation of 75,000 copies; *Conqueror* (monthly magazine), 15,000 copies. The army had found employment during the year for 9,803 persons.

The recruits for the army are from all conditions of life, and innumerable converts are not qualified to teach or exhort. For these there are over forty training-schools scattered through the jurisdiction. Other institutions, to promote emigration, to reform debased converts, thriftless from the slums, and to deal with the whole problem of outcasts, grew out of General Booth's book, *In Darkest England, and the Way Out* (1890). Large sums were intrusted to him to carry out his schemes, none of which have been sufficiently tried to enable one to form a judgment of their social value.

The army has spread its operations over Great Britain, France, Switzerland, Sweden, Canada, Australia, New Zealand, Tasmania, India, Ceylon, South Africa, Germany and the United States. Wherever it goes it conforms to the conditions that confront it, save in its evangel of salvation through Jesus Christ. It conforms in costume, in adjustments to suit the high and the lowly, in every way that will secure a hearing. It would be all things to all men in an apostolic sense, and it believes itself in possession of apostolic equipments and methods.

In 1895 there were 12,050 officers, composed of men and women whose lives are entirely given to the work; 4,345 corps or societies, operating in 38 countries and colonies in 34 languages. There were some 2,098,631 meetings held annually, outdoors and in. The number of periodicals printed or published is 44, with a combined circulation of over a million. The annual rental-roll is over \$1,000,000. The amount of property owned by this organization now exceeds \$4,000,000, and the annual income is \$3,645,000. The United States division of the Salvation Army has to-day 2,125 officers, 654 corps or societies, 16 slum posts, 6 rescue homes, 5 food and shelter depots. The organization also has in the United States, cavalry brigades, out-riders' circuits, maternity homes, labor bureaus, women's shelters, and an inquiry department, which looks up missing friends and relatives. They publish the *War Cry*, one edition in New York City and another on the Pacific Coast; a Swedish and also a German edition in New York City, with a combined circulation of 90,000; *The Young Soldier*, weekly circulation 35,000; and *The Conqueror*, monthly, 16,000.

The following is a statement in detail of the distribution of the Salvation Army in the world:

COUNTRIES.	CORPS OR SOCIETIES.	OFFICERS.
United Kingdom-----	1,338	4,306
Australia-----	831	1,527
United States-----	654	2,125
France and Switzerland-----	219	435
Sweden-----	203	658
Canada-----	355	809
New Zealand-----	188	313
India-----	188	555
Holland-----	63	312
Denmark-----	72	257
Jamaica-----	42	83
Norway-----	65	253
Germany-----	21	64
Belgium-----	14	36
Finland-----	19	61
Argentine Republic-----	10	41
South Africa-----	55	187
Italy-----	8	28
Total-----	4,345	12,050

D. O. KELLOGG.

SALVIA or SAGE, an herb. See HORTICULTURE, Vol. XII, p. 252.

SALVINI, TOMMASO, an Italian tragedian; born in Milan, in 1830. His father, being a professor of literature, gave him an excellent education. He was at first connected with the royal theater at Naples, and afterward played for six years with another troupe in several Italian theaters. For some time he played with Madame Ristori. His greatest success was at Florence, in 1865, on the 600th anniversary of Dante's birth, when he played the part of "Lancelotto" in the tragedy *Francesca di Rimini*, Madame Ristori playing "Francesca." Salvini played his rôle with such astonishing force as to attract marked attention to himself. The grateful city of Florence presented him with a statuette of Dante. In 1875 Salvini visited the United States, and again in 1881. His chief parts were Othello, Hamlet, Saul, and Orosmanes. His personation of Othello especially was received with great enthusiasm. The elements of his success are his splendid physique, noble bearing, perfect elocution, dramatic power and vehement passion. When in 1868 he performed at Madrid in *La Morte Civile*, the audience, carried away with the intense realism of the death he enacted before them, rushed upon the stage to see if the actor was yet alive. Salvini's last appearance in England was in 1884. He received the honor of knighthood from King Victor Emmanuel.—His son, ALEXANDER SALVINI, followed in his father's footsteps, and obtained measurable success in the *Three Guardsmen*, and other plays. He starred in the United States. He died Dec. 15, 1896.

SAMANA BAY. See HAYTI, Vol. XI, p. 543.



TOMMASO SALVINI.

SAMAR. See PHILIPPINES, Vol. XVIII, p. 752.

SAMARANG. See JAVA, Vol. XIII, p. 606.

SAMARIUM, a new element found in samarskite, the molecular weight of whose oxide is less than 117. It was first discovered by M. Delafontaine in 1878, but not verified until by M. Lecoq in 1881. It is regarded identical with the $\beta\beta$ described by Marignac.

SAMBRE, a river of France and Belgium, the principal affluent of the Meuse; navigable for barges the greater part of its course; rises in the French department Aisne; flows northeasterly between the valleys of the Scheldt and Oise, through the Belgian provinces of Hainault and Namur, and in the latter province joins the Meuse after pursuing a total course of 100 miles. The Sambre is connected by canals with the Senne and Scheldt in Belgium, and with the Oise in France; its basin produces large quantities of coal.

SAMOA. For general article on this group of 14 volcanic islands in the South Pacific, see NAVIGATORS' ISLANDS, Vol. XVII, p. 279.

Area, 1,701 square miles; population, 36,000, of which 16,600 are in Upolu, 12,500 in Savaii, and 3,750 in Tutuila. The natives are Polynesians, and there are about three hundred whites. The natives are all Christians (Protestants and Roman Catholics), and schools are attached to the churches. The trade is largely in the hands of German and British firms. Imports 1894, \$438,400; exports \$310,100. Chief imports: dry-goods, trinkets, arms, ammunition, machinery; chief exports: copra, cotton and coffee.

At a Samoan conference at Berlin in 1889, of representatives of Great Britain, Germany and the United States, an act was signed (June 14th) guaranteeing the neutrality of the islands, in which the citizens of the three signatory powers have equal rights of residence, trade and personal protection. The three powers recognize the independence of the Samoan government and the right of the natives to elect their chief or king, and to choose their own form of government. A court is established, consisting of one judge, who shall be styled chief justice of Samoa. This court has jurisdiction in (1) all civil suits concerning real property; (2) all civil suits between natives and foreigners or between foreigners of different nationalities; (3) all crimes and offenses committed by natives against foreigners, or committed by such foreigners as are not subject to any consular jurisdiction.

All future alienation of lands is prohibited, with certain specified exceptions. The land commission under the treaty found the claims of foreigners amounted to more than 700,000 acres more than the island contained. In 1894 it allowed German claims to the extent of 75,000 acres, British 36,000, and American 21,000. Revenues arise from customs and taxes, paid chiefly by foreigners, no attempt being made to collect the small capitation-tax from natives. A local administration is provided for the municipal district of Apia.

As a result of the conference, the United States Congress appropriated \$100,000 to establish a coaling-station at the port of Pango-Pango, and half a million dollars to enable this country to carry out its treaty obligations with Samoa and for the upholding and protection of American rights in those islands. The American system of money was adopted, but the English money is commonly used. On March 15, 1889, the islands were swept by a disastrous hurricane, when several German and American men-of-war were driven ashore, many lives were lost, and 15 merchant vessels were either sunk or cast on the beach.

On April 19, 1890, a treaty was signed by King Malietoa, who meantime had been restored as the reigning monarch, November 9th of the preceding year, which embodied in its terms the results of the Berlin conference. This treaty prohibited the sale of arms and ammunition and the trade in liquor between the natives and foreigners. Troubles in the interior, however, continued for some time later, as the natives there supported the claims of Tamasese to the throne.

Cocoa plantations were begun in 1892. More than half of the ships that enter and clear at the port of Apia are British, but on the other hand the value of the imports carried in German vessels are greater than those carried in British or American. There is now regular steam communication with San Francisco, Auckland and Sydney.

SAMPHIRE, a name given to numerous plants of widely separated families, but chiefly to *Crithmum maritimum*, belonging to the family *Umbelliferae*, a succulent European herb of rocky sea-coasts, whose young herbage is used for making pickles.

SAMPSON, EZRA, an American clergyman and author; born in Middleboro, Massachusetts, Feb. 12, 1749; graduated at Yale, in 1773; settled as pastor of the Congregational Church at Plympton, Massachusetts, from 1775 to 1796; Revolutionary army chaplain at Cambridge, in 1775; one of the judges of the court of Columbia County, in 1814, which office he soon resigned. He was associate editor from 1801 to 1804 of *The Balance*; edited the Connecticut *Courant* in 1804-05. His publications include *Sermon Before Colonel Cotton's Regiment* (1775); *Thanksgiving Discourse* (1795); *The Beauties of the Bible* (1802); *The Sham Patriot Unmasked* (1803); *The Historical Dictionary* (1804); *The Brief Remarker on the Ways of Man* (1817). He died in New York City, Dec. 12, 1823.

SAMSON, GEORGE WHITEFIELD, an American theologian and art critic; born in Harvard, Massachusetts, Sept. 29, 1819; graduated at Brown University in 1839; at Newton Theological Institute in 1843; was pastor of a Baptist church at Washington, District of Columbia; president of Columbia College, District of Columbia, (1859-71); of Rutgers College for Girls (1871-79), and pastor at Harlem. He traveled extensively in the East, and published his impressions in 1848. Among his other works are *To Daimonion, or the Spiritual Medium* (1852);

Spiritualism Tested, a revised edition of the former (1860); *Outlines of the History of Ethics* (1860); *Elements of Art Criticism* (1867); *Physical Media in Spiritual Manifestations* (1869); *The Atonement Viewed as Assumed Divine Responsibility* (1878); *The English Revisers' Greek Text Shown to be Unauthorized Except by Egyptian Copies Discarded by Greeks* (1882); *Guide to Bible Interpretation* (1887); *Tested Truths as to Relations of Capital and Labor* (1890); *Classic Text of Authorship: Authenticity of Authorship Applied to the Old and New Testament Scriptures* (1893).

SAMSUN, a town in the village of Trebizond, on the southeastern shore of the Black Sea, midway between the deltas of the Yeshie-Irmak and Kizil-Irmak, about 80 miles S.E. of Sinope. The climate is warm and moist, and the marshy nature of the surrounding country productive of fevers. The town is the principal port on the Black Sea for the interior of Asia Minor, and a station for steam navigation. Its chief exports are wool, silk, grain, fruit, wine, wax, gums, valonia, opium and tobacco. The population in 1890, consisting chiefly of Turks, Greeks and Armenians, was about 2,000.

SAMUELSON, JAMES, a British author; born in Hull, England, in 1829. He studied zoölogy in Königsberg University; was called to the bar in 1870, but never practiced; engaged in manufacturing enterprises, but left the management to his sons, and devoted most of his time to travel and writing; founded and was president of the Liverpool Science and Art Classes, and frequently acted as an intermediary in labor troubles, especially in the Dock Strikes of 1879. He wrote a scientific work, *Humble Creatures* (1860); *Roumania, Past and Present* (1882); *India, Past and Present* (1889); the social works, *The German Workingman* (1869) and *The History of Drink* (1879). He was editor of a quarterly review called *Subjects of the Days*.

SAMURAI. See JAPAN, Vol. XIII, pp. 580-583.

SAN ANGELO, a town and the capital of Tom Green County, southwestern central Texas, on the Concha River and on the Gulf, Colorado and Santa Fé railroad, about 180 miles W.N.W. of Austin. The chief industries are ice-manufacturing and flour-milling. The surrounding country is devoted to the raising of cattle, sheep and horses; fruit is abundantly produced, and good building-stone is plentiful. Population 1890, 2,615.

SAN ANTONIO, TEXAS. In 1890 San Antonio was the center for four railroads, the International and Great Northern, San Antonio and Aransas Pass, San Antonio and Gulf Shore and the Southern Pacific. In the line of manufactures it has cement, iron and electric-light works, foundries and machine-shops, factories for the production of doors, sash, blinds, cigars and tobacco, hardware and metals, cottonseed oil and baking powder, etc., all of which are in active operation, numbering, in 1890, 43 establishments, with an aggregate capital of \$1,648,392. It has a system of water-works,

many miles of paved streets, electric lights and a well equipped electric-railway service. Besides a fine system of public schools, there are a number of institutions under personal and denominational control. The notable buildings are a county courthouse costing nearly \$1,000,000, a United States government building, several hospitals, and halls belonging to secret societies. The surrounding region is devoted to agriculture and grazing, and does a large business in cotton, wool, hides and live-stock. Population 1890, 37,673; 1895 (estimated), 57,000.

Fort Sam Houston, a United States military post in the Department of Texas, is situated two miles N. of San Antonio, which is the post-office, telegraph and railroad station for the post. The fort is in a reservation covering 469.23 acres, and has accommodations for 34 officers, 3 troops of cavalry, 8 companies of infantry and one light battery. In 1895 it was garrisoned by two troops of cavalry, eight companies of infantry and a battery of artillery. For general article, see SAN ANTONIO, Vol. XXI, pp. 254, 255.

SAN ANTONIO RIVER, a stream formed by the union of Medina River and Leon Creek, in Bexar County, southeastern central Texas. After flowing southeasterly for about 175 miles, through the counties of Wilson, Karnes and Goliad, it enters the Gulf of Mexico, 130 miles S.W. of Galveston, by way of Espiritu Santo Bay.

SAN BERNARDINO, a city and the capital of San Bernardino County, southeastern California, on the Southern California and the Southern Pacific railroads, about 60 miles E. of Los Angeles. It is noted for its magnificent scenery, having mountains on three sides of it, Mount San Bernardino, the highest peak in the Coast Range, being twenty miles to the westward. The climate of the region is delightful, making the city a resort for health-seekers. It is the shipping-center for a district producing minerals, fruits, wines and honey. The shops of the Southern California railway are located here. Population 1890, 4,012.

SAN BLAS, a town and the port of the territory of Tepic, state of Jalisco, western Mexico, on the Pacific coast, at the mouth of the Santiago River. A sheltered bay to the westward of it admits vessels of light draft, while large vessels anchor in the open roadstead and discharge their freight in lighters. The port is of considerable importance, being the most frequented between Acapulco and Mazatlan. A railway connecting the port with the interior was in course of construction in 1895. The climate is unhealthy, and intermittent fevers are prevalent, but yellow fever is almost unknown. Population, about 2,000.

SAN BLAS, CAPE, the extreme southern point of Calhoun County, northwestern Florida, about 125 miles S.E. of Pensacola, in lat. 29° 39' 46" N., and long. 85° 21' 38" W. It has a revolving light 98 feet in height.

SAN BLAS, GULF or BAY OF, a bay on the northern side of the Isthmus of Panama, in long. 79° W., where the isthmus has its narrowest point, being but 31 miles wide here, and takes the

name of San Blas. This neck of land has at times been suggested as a route for an inter-oceanic ship-canal, but surveys have shown the project to be impracticable, owing to the high mountains which would have to be crossed.

SAN BONIFACIO DE IBAGUÉ, a town and the capital of the department of Tolima, western central Colombia, 90 miles W. of Bogotá, on western affluents of the Magdalena River, on a plateau having an elevation of 4,300 feet. It has a healthful climate and is the center of a district producing tropical and semi-tropical fruits. There are, in the vicinity, warm springs, sulphur-deposits and silver-mines. The port of the town is Guataquisito, on the Magdalena River, to which a railroad is projected. Population 1892, about 12,000.

SANBORN, FRANKLIN BENJAMIN, an American philanthropist; born in Hampton Falls, New Hampshire, Dec. 15, 1831. He graduated at Harvard; became secretary of the Massachusetts and Kansas Committee in 1856; was an active member of the Massachusetts State Board of Charities, secretary of the American Social Science Association and of the Concord Summer School of Philosophy; and brought about many reforms in Massachusetts charitable, penal and other public institutions. He wrote *Life of Thoreau* (1882); *Life and Letters of John Brown* (1885); *Sonnets and Canzonets* (1882).

SAN BUENAVENTURA, a city and the capital of Ventura County, Southern California, on the Pacific Ocean, and on the Southern Pacific railroad, about 60 miles W.N.W. of Los Angeles. It was the seat of an old Spanish mission, from which it derives its legal name, its post-office designation being Ventura. It is the center of a district engaged in agriculture and fruit-growing; has a fine harbor, and possesses hot springs, which, with the healthful climate, have made the place a popular resort for invalids. Population 1890, 2,320.

SAN CARLOS OR BARINAS, a town of Zambora, Venezuela, 120 miles W.S.W. of Caracas, near the Santo Domingo River. The town, which has been twice devastated, was founded in the sixteenth century, and is now noted for its large shipments of tobacco. Population, about 4,000.

SANCTIFICATION. See PAUL, Vol. XVIII, p. 425.

SAND. See GEOLOGY, Vol. X, pp. 236, 237.

SAND, GEORGE. See DUDEVANT, MME., Vol. VII, pp. 507-510.

SAND-BLAST. See Vol. XXI, p. 257.

SANDELWORT, a member of the sandalwood family. See SANDALWOOD, Vol. XXI, pp. 255, 256.

SANDEMAN, ROBERT, and SANDEMANIANS. See GLAS, JOHN, Vol. X, p. 637.

SANDERLING, a bird. See SANDPIPER, Vol. XXI, p. 261.

SANDERS OR RED SANDERSWOOD. See SANDALWOOD, Vol. XXI, p. 256.

SANDERS, NICHOLAS (1527-79), an English Roman Catholic clergyman; an Oxford graduate; religious refugee in Rome; papal nuncio at Madrid; organized an invasion of Ireland; author

of a Latin treatise on the Anglican schism. See IRELAND, Vol. XIII, p. 264.

SANDERSON, JOHN, an American author; born near Carlisle, Pennsylvania, 1783. He studied law in Philadelphia, but became a teacher in Clermont Seminary; contributed to *Dunrie's Portfolio*; with his brother, prepared the first two volumes of *Lives of the Signers of the Declaration of Independence* (1820); his health failing, he went to Europe in 1835, whence he wrote *Sketches of Paris* (1838), afterward called *An American in Paris*; started a similar work, *Sketches in London*. The last few years of his life he was professor of Latin and Greek in the Philadelphia High School. He died April 5, 1844.

SANDERSON, JOHN SCOTT BURTON, a British physiologist; born in Newcastle-on-Tyne, England, Dec. 21, 1828. He studied medicine at the universities of Edinburgh and Paris; became a fellow of the Royal College of Physicians, London, 1863; practiced in London and was assistant at the Middlesex and Brompton Hospitals until 1871; was superintendent of the Brown Institution from 1871 to 1878; was professor of physiology in University College, 1874 to 1882; and in the latter year was appointed to the same chair in Oxford. He served on various commissions to investigate epidemic and infectious diseases, and has produced numerous papers on these subjects, and on physiological and pathological subjects, before the Royal Society, and was lecturer of the society in 1867 and 1877.

SANDERSVILLE, a city and the capital of Washington County, eastern central Georgia, on the Augusta Southern and the Sandersville railroads, about 70 miles S.W. of Augusta and 64 miles N.N.E. of Macon. It is situated in a fertile district devoted to farming and the raising of cotton, the shipping-trade in the latter product being quite considerable. Population 1890, 1,760.

SAND-FLIES OR SIMULIUM. See MOSQUITO, Vol. XVI, p. 866.

SANDHOPPER OR ORCHESTIA. See CRUSTACEA, Vol. VI, p. 661.

SANDHURST. See ARMY, Vol. II, p. 585.

SAN DIEGO, a port of entry and the chief city in Southern California, in San Diego County, of which it is the capital. It is an important railroad center, being located on the Coronado, National City and Otay, San Diego, Cuyamaca and Eastern, San Diego, Pacific Beach and La Jolla, and Southern California railroads. The soil in the vicinity of the city is of exceptional fertility, the orange, fig, olive, date-palm and other tropical fruits being successfully cultivated, while San Diego County is the principal honey-producing county of the state. The city contains three parks, a United States custom-house, a public library, two national and three state banks, capitalized, in the aggregate, at \$580,000; a private bank, several churches, two female seminaries and a full complement of school accommodations, a daily and six weekly newspapers and two monthly periodicals. The manufacture of machinery, hardware, plumbing goods, cigars, leather, boilers, cornices, carriages, fencing, beer,

wine, etc., is profitably carried on, and other lines of industrial endeavor are successfully established. Easy transit is furnished to all portions of the city by cable and electric railways, and the city is well lighted, both by gas and electricity. To the north of the city is the old city of San Diego, and within a short distance of the new city is a lake of boiling mud half a mile long. On the opposite side of the bay, and connected by ferry with San Diego, is Coronado Beach, a popular resort containing many fine residences, and having a hotel accommodating 1,200 guests that cost nearly \$1,000,000. The city, which contained a population of but 2,637 in 1880, had, in 1890, 16,159 inhabitants. See also SAN DIEGO, Vol. XXI, p. 259.

SAN DIEGO, a town and the capital of Duval County, southeastern Texas, on the Mexican National railroad, about 55 miles W. of Corpus Christi. The staple products of the county are cattle and horses. The inhabitants are mostly Mexicans. Population 1890, 1,877.

SAND-LANCE OR SAND-LAUNCE. See SAND-EEL, Vol. XXI, pp. 257, 258.

SANDS, BENJAMIN FRANKLIN, an American naval officer; born in Baltimore, Feb. 11, 1811. He entered the navy as a midshipman in 1828; served off the east coast of Mexico during the war with that country; was connected with the Coast Survey from 1851 to 1859; served as captain during the Civil War; was appointed commodore in 1866, and rear-admiral in 1871, being retired in 1874. He was superintendent of the Naval Observatory at Washington in 1867, and remained at that post until the latter part of 1873. He died in Washington, District of Columbia, June 30, 1883.

SAND-STAR OR OPHIURIDEA. See ECHINODERMATA, Vol. VII, pp. 634, 635.

SANDSTONE. See GEOLOGY, Vol. X, p. 236.

SANDUSKY, a city and the capital of Erie County, Ohio. Population 1890, 18,471. See also SANDUSKY, Vol. XXI, p. 261.

SAND-WASP. See HYMENOPTERA, Vol. XII, p. 573.

SANDWICH, a manufacturing town of DeKalb County, northern Illinois, on the Chicago, Burlington and Quincy railroad, 18 miles W.S.W. of Aurora and 57 miles in the same direction from Chicago. It produces cheese, flour, windmills and agricultural machinery. Population 1890, 2,516.

SANDWICH, a post township of Barnstable County, southeastern Massachusetts, on Cape Cod Bay, and on the New York, New Haven and Hartford railroad, about 62 miles S.E. of Boston. The township lost a considerable part of its territory and population by the setting off of the township of Bourne in 1884. It contains the villages of Sandwich, East Sandwich, Forestdale and Spring Hill. The region is popular as a summer resort, and has manufactures of glass, jewelry, braids, tags, etc. Population 1890, 1,819.

SANDWICH, a post village and the capital of Essex County, southwestern Ontario, Canada, on the Detroit River, nearly opposite Detroit, and about two miles S.W. of Windsor. It is one of the oldest settlements in this part of Canada. Coloniza-

tion is said to have begun in 1700, when the place was known as Pointe de Montréal. A house of the Basilian Monks, and Assumption College, a Roman Catholic institution, are located here. The existence of mineral springs makes it a resort for invalids. It has a brewery and several mills. Population 1891, 1,352.

SANDWICH ISLES. See HAWAIIAN ISLANDS, Vol. XI, pp. 528-532; and in these Supplements.

SANDY HILL, a town and the capital of Washington County, New York, on the east bank of the Hudson, and on the Delaware and Hudson railroad, 56 miles above Albany. It has an abundant water-power, which runs several paper and planing mills; has stone-quarries in the vicinity, and important lumber interests. Population 1890, 2,895.

SANDY HOOK, the name given to a low, sandy point of land extending northward from the northeastern extremity of Monmouth County, eastern New Jersey, for about nine miles, between the Navesink River and Sandy Hook Bay on the west and the Atlantic Ocean on the east, and having an extreme width of less than a mile. Near the northern extremity of the peninsula is a lighthouse ninety feet high. A little to the south of this are fortifications for defending the entrance to New York harbor. Here, also, is the government proving-ground, where tests are made of armor-plate and ordnance.

SANDYS, EDWIN, an English archbishop; born in Hawkshead, Lancashire, in 1519. He graduated at Cambridge (1519); took orders in the Church of England; became vice-chancellor of Cambridge University in 1553; was deprived of his office because he had preached a sermon in support of the royal claims of Lady Jane Grey, and was imprisoned for refusing to proclaim Queen Mary. On his liberation he went to the Continent, but returned when Elizabeth ascended the throne; was created bishop of Worcester (1559); of London (1570); and archbishop of York (1576). A volume of his poems was published in 1585. He died July 10, 1588.

SANDYS, SIR EDWIN, an English statesman; born in Worcester in 1561. He was educated at Oxford; supported the claim of James I to the throne, and was knighted in 1603; was an active member of the Virginia Company, and instituted many reforms, one of them being the introduction of voting by ballot; was made treasurer in 1619; became obnoxious to the Spanish party, and was imprisoned in 1621. He published *Europa Speculum; or, A Survey of the State of Religion in the Western Part of the World*. He died in Northborne, Kent, 1629.

SAN FELIPE DE ACONCAGUA. See ACONCAGUA, Vol. I, p. 98.

SAN FILIPPO D'ARGIRÒ, a town of southeastern Sicily, in the province of Catania, situated on the right bank of the Traina. A considerable quantity of saffron is grown in the vicinity. Population, 7,500.

SANFORD, a city of Orange County, eastern Florida, on Lake Monroe, an expansion of the St. Johns River, and on the Jacksonville, Tampa and Key West, Sanford and St. Petersburg and Savannah, Florida and Western railroads, about 125 miles S.S.E. of Jacksonville; founded in 1870 by General

Sanford. Being at the head of navigation for large boats on the river, it is an important shipping-point for oranges and early vegetables. It has railway car-shops, machine-shops, fruit-preserving and cigar factories. Population 1890, 2,016.

SAN FRANCISCO, a city of western California. (For general article, see SAN FRANCISCO, Vol. XXI, pp. 262-265.) Among the notable buildings erected



CITY HALL, SAN FRANCISCO.

since 1880, in San Francisco are the New City Hall, the Crocker Building, the Chronicle Building, Academy of Sciences; Pioneer Hall, the Lick Public Baths and the Mills Building. The city is lighted by gas and electricity, and local transit is carried on by cable and electric street-railways. In 1890 there were 135 churches, divided among almost all the leading denominations. Some of the well-known church edifices include St. Mary's Cathedral (Roman Catholic), Grace Church (Protestant Episcopal), Trinity Cathedral (Protestant Episcopal), Sherith Israel Synagogue, and Calvary Presbyterian and the First Unitarian churches. The Chinese, also, had six large joss-houses. According to the school census of 1893 the number of children of school age (5 to 17 years) was 68,390, of which 44,349 were enrolled in public schools, and 8,973 in private or parochial schools. The value of public school property was estimated at \$5,063,363, and expenditures of the year were \$989,009. There are also numerous institutions for higher education and technical and professional training, some of the more important of those recently established being the Hastings College of Law, the Dental Department of the University of California, also the medical and pharmaceutical departments of the same university, a training-school for nurses, and an industrial school. The Mechanics Institute, the Academy of Sciences and the Lick Mechanical Art School are all devoted to technical education. Among the numerous libraries are the Bancroft, having 45,000 volumes; the Bibliothèque de la Ligne Nationale Française, 13,000; the Free Public, 69,000; the Mechanics Institute, 57,900; the Mercantile Library Association, 62,000; the Odd Fellows, 42,500; the St. Ignatius College, 30,000; the San Francisco Law, 31,000; the Sutro, 200,000.

These are the figures as reported in 1893. In 1895 there were published, in the city, 15 daily, 81 weekly, and numerous semiweekly, semimonthly, monthly and quarterly periodicals.

San Francisco's unexcelled transportation facilities, by both land and water, make it one of the most important commercial centers in America. Its railroads, the California and Nevada, the San Francisco and North Pacific, and the Southern Pacific, give it communication with all parts of the country, while vessels leave its port for all parts of the world. For the year ending June 30, 1890, the total imports of merchandise were \$48,751,223; of treasure, consisting of gold and silver bullion and coin, \$8,020,849; exports of merchandise, foreign and domestic, \$36,876,091; of gold and silver bullion and coin, \$5,710,564; 810 vessels, of 1,030,538 tons, entered, and 826 vessels, of 1,080,974 tons, cleared, the port. The receipts at the custom-house were nearly \$8,000,000, and the immigrants landed, including 1,716 Chinese, numbered 3,606.

In the returns for 1890 there were reported 4,059 establishments, employing \$74,834,301 in capital, paying \$30,979,374 in wages to 48,446 persons, and \$78,656,470 for materials, from which were turned out products valued at \$135,625,754. According to capital employed, the principal industries were refining of sugar and molasses, breweries, manufactures of men's clothing, foundries and machine-shops, coffee and spices, boots and shoes, flour and grist mills, leather, canning of fruits and vegetables, printing and publishing, saddlery and harness, ship-building, slaughtering, and packing tobacco.

The assessment roll of personal property in 1890 showed a value of \$66,243,938. The debt of the municipality is \$1,800,000. The rate of taxation is less than that of any large city in the country, the city officers being pledged to keep it within \$1 on every \$100 of valuation. There are 15 incorporated commercial or discount banks, with an aggregate paid-up capital of \$37,000,000. Three private banks add \$1,260,000 to this amount. The annual transactions of these 18 institutions, as represented by the clearing-house statements, are nearly \$844,000,000. There are 12 savings banks, with a total of deposits, in round numbers, of \$87,000,000.

The population, which, in 1880, was 233,959, had increased, in 1890, to 298,997, of whom 127,000 were foreign-born.

SAN FRANCISCO MOUNTAIN, the highest peak of Arizona, having an altitude of twelve thousand eight hundred feet above the sea-level, situated in the Great Colorado plateau, Coconino, northern central part of the territory, lat. 35° 27' N., long. 111° 40' W. The mountain rises to a height of five thousand feet above the plateau, and, standing alone, is a conspicuous landmark. It is largely of volcanic origin, and near it are many extinct volcanic cones, among them Bill Williams, Kendricks and Sitgreaves.

SANGA. See GALLA OX, in these Supplements.

SANGHA or SAMGHA. See BUDDHISM, Vol. IV, pp. 434, 435.

SANGIR or SANGI ISLANDS, a group of small islands in Malaysia, connecting the Celebes

and Philippine Islands, in lat. $3^{\circ} 28' N.$ and long. $125^{\circ} 44' E.$ They are under the suzerainty of the Dutch. The largest island, Great Sangir, has a length of about thirty miles and an average breadth of ten miles. It contains the celebrated volcano Abu, by an eruption of which, in 1856, two thousand eight hundred people were estimated to have perished; another violent eruption was contemporaneous with that of Krakatoa. The islands produce woods, cocoa, rice, sago, trepang and turtles. Population 1888, 76,387.

SANGKOI OR SONGKOI. See TONG KING, Vol. XXIII, pp. 439, 440.

SANGREAL, SANGRAAL OR HOLY GRAIL. See GRAIL, Vol. XI, pp. 34-36.

SANGSTER, MARGARET ELIZABETH MUNSON, an American journalist; born in New Rochelle, New York, Feb. 22, 1838. She wrote for *Hearth and Home* (1871-73); *Christian at Work* (1873-79); *Harper's Young People* (1882); became editor of *Harper's Bazar* in 1889. She published *Poems of the Household* (1883); *Home Fairies and Heart Flowers* (1887); *Hours for Girls*; *Splendid Times*; and *On the Road Home* (1894).

SANGUINARIA. See BLOODROOT, in these Supplements.

SANHEDRIM. See SYNEDRIUM, Vol. XXII, p. 812.

SANITARY COMMISSION. At the outbreak of the Civil War the Army Medical Bureau found itself face to face with a task with which it was unable to cope, especially as legislation was lagging far behind the sudden growth of the army. Local organizations had sprung up everywhere, devoted to the welfare and comfort of the army, and it was through an endeavor to systematize these that the Sanitary Commission arose. Drs. Henry W. Bellows, Van Buren, Harsen and Harris held a conference with the government and urged the necessity of doing something to lessen the peril arising from bad sanitary condition. Finally, the Medical Bureau consented to the formation of a non-official association for such work, and on the 9th of June, 1869, the Secretary of War authorized Rev. Dr. Bellows, Prof. A. D. Boche, Walcott Gibbs, Drs. Jeffries Wyman, W. H. Van Buren and S. I. Howe, and three army officers, A. E. Shiras, G. W. Cullum and Dr. R. C. Wood, to act as such a board, and associate others with them at their discretion. Thus the Commission escaped officialism, and was able to throw itself upon the sympathies of the public. However, the Commission was in fact merely an advisory board which acted through the Medical Board, an institution hindered by obsolete traditions and regulations. But, early in 1862, measures were taken by Congress to secure a greater freedom of action for the Commission. In order to facilitate research and the distribution of stores in emergencies, a system of inspectors was appointed, to whom were given such duties as required contact with those in authority and the direction of operations in the camps. They were usually men of wide medical learning, were pledged for a certain time, and were subject to such drill and regulations regarding promotion as the service would

allow. Dr. Henry G. Clark, with a corps of sixty of these inspectors, undertook to investigate the hospitals, with a view to gathering information which would lead to their improvement. Out of this grew the American pavilion hospitals adopted by the government.

At first the facilities for transportation of stores was limited, as the medical department was dependent upon the quartermaster for these. But the commission fitted out trains of horses and wagons, chartered and fitted up steamboats, at the expense of the government, and constructed hospital-cars for the care and transportation of sick and wounded soldiers.

They were constantly on the watch to prevent the introduction or development of disease. Their influence with the regimental surgeons was great in bringing about the proper selection of camp sites, proper cooking, drainage and cleanliness. But their chief services in this capacity was the securing of proper food when the army was assailed by scurvy, smallpox, yellow fever, or other diseases. They even went so far as to start several immense truck-gardens for supplying vegetables to the army, while all luxuries, like ices, wines, etc., for the sick, passed through their hands.

Thousands of men were constantly passing to their regiments at the front, or being dismissed, were going home, or were being moved from one point to another. In the early part of the war especially, there was much confusion, owing to general ignorance of rules and incompetent officers. In many cases these men encountered difficulties in securing their pay or papers, were in ill health, or beset by swindlers. The Commission did what it could to help these men, gave them food, furnished information, and even acted as their attorneys in securing pay or papers, and secured the acquittal of many who were wrongfully accused of desertion. As many as forty homes or resting-places were established for this purpose, near depots of transportation and centers of distribution. This branch of the service afterward developed into the Pension and War Claim Bureau.

For regular soldiers two forms of aid were provided,—one known as "general relief," which concerned hospitals, the other being known as "battle-field relief." Besides the inspectors, scores of assistants and relief agents, some of whom were women, and all educated and competent persons, were attached to each column. They looked after all matters of sending wounded to the rear, attended their injuries and provided for their proper transfer to the permanent hospitals. One of the noteworthy institutions established by this Commission was the Soldiers' Directory, in which over six hundred thousand names appeared. All latest information was added, so that questions regarding any of the men whose names were in the directory could be answered correctly.

The Sanitary Commission, by reason of its non-official nature, appealed to the citizens, and it gradually became "the vehicle of a nation's bounty." It was the medium through which women could make sacrifices for their imperiled country, many going

to the front as nurses or even attendants on battle-fields, while others worked at home, preparing with loving hands the comforts for the men suffering at the front.

It has been estimated that \$15,000,000 worth of supplies was received by the Commission, while \$4,962,014 was poured into its treasury. In the early part of the war, before it had gained a reputation, supplies came slowly, but at the latter end they poured in from all directions. Fairs were carried on in different cities for its benefit, which netted nearly \$3,000,000, while \$745,000 were sent by foreign countries. While the commissioners served without pay, it became necessary to furnish regular salaries to officers and agents, in order to avoid an irregular and constantly changing service. The original board appointed by the Secretary of War, together with their associates, numbered 14, with headquarters in Washington. This board created a standing committee, with headquarters in New York, which remained in daily session till the end of the war. It consisted of Dr. Bellows, Drs. Van Buren and Agnew, Professor Gibbs, G. T. Strong and Charles J. Stillé, who later became its authorized historian. The executive duties of the board fell upon F. L. Olmsted and John S. Newberry; the former, who was succeeded by Dr. Jenkins, was secretary of the board and the latter secretary of the western division. The commission established a Bureau of Vital Statistics, whose reports were extremely valuable and have done much to reorganize the medical service of both army and navy.

SANITARY CONVENIENCES OF MODERN HOUSES. The increased use of indoor closets, sinks, basins, etc., in many-storied buildings makes the matter of arrangement of these sanitary conveniences one of material interest, as affecting the health of all the occupants. The most marked change in connection with this work, within recent years, has been in the direction of placing the plumbing connections in more accessible locations. Formerly, it was considered desirable to place all the plumbing out of sight, within floors and partitions, or in dark closets, under stairways, or in out-of-the-way corners. They were considered unsightly. Now the best practice is to use exposed plumbing, as much as a due regard for appearances will permit, and the pipes are often gilded and made otherwise ornamental. The reason of the change is based on common sense. The drainage, soil and waste pipes of a building carry foul matter and give out bad air wherever there is a leak. If hid away, leaks are not discovered readily, and malaria and fevers spring out as the first indication that repairs are needed to the pipes. With plumbing arranged for easy inspection, leaks are apt to be noticed and promptly repaired, preventing the ills that follow in their train.

Cast-iron pipe is commonly used for drain and soil pipe in the United States, while lead pipe is frequently preferred in Great Britain, the claim being made that it is smoother and allows a freer flow. American drain-pipe, however, is amply smooth, and entirely satisfactory. Trouble will arise with any kind of pipe if there is not sufficient fall allowed to

give enough speed to the fluid to render the pipes self-cleansing. Four-inch pipe should have a flow of at least four feet a second, and six to nine inch pipe should be given a flow at the rate of three feet a second.

A lavatory, or wash-basin, is often an annoyance, from the choking up of the valve with soap and accumulated dirt. Some sort of a screen has to be placed over the outlet, and the ordinary flowing out of the water is hardly sufficient to keep it clean. A recent device for overcoming the difficulty is a flushing-rim, which drives the water around circularly with considerable force and rinses the basin. Another good form of lavatory has a push-down piece, which raises the valve completely, allowing free flow into the outlet. This basin is made in one piece, of glazed earthenware, so that it is easily cleaned and kept in condition. It is provided with brass cylinder traps, having unions all ground to accurate fits. Kitchen sinks are troublesome to the plumber, as it is from them that the most grease and refuse usually gets into the pipes. Some of them are supplied with special grease-traps, but unless these are cleaned at regular intervals they become a foul nuisance. One of the best sinks is made of copper, with nickel-plated waste and overflow, and so recessed at the waste that the kitchen-maid can readily scrape up the grease as it accumulates there, without allowing it to go down the pipes. When the pipes become heavily coated with grease they retain various food-scrap, which rot and give off unwholesome odors. In such a case, hot water and ammonia should be poured down in liberal quantities to cut out the grease. It is best to connect kitchen sinks with the nearest soil-pipe, because the natural animal ammonia in the latter is usually sufficient to carry off all grease beyond that point.

Bath-tubs are made of galvanized sheet-iron, with a wood body; of zinc or copper, tinned or nickel-plated; of cast iron, with porcelain enamel; and of indurated fiber enameled. Porcelain tubs are preferred for hospital use, being non-absorbent, but copper is most commonly used for dwellings. In the more recent patterns, the tubs are not inclosed with wood, but stand on four metal feet, with exposed piping. Some are made independent of the heating-appliances in the house, having a set of tubes at the end, below which are placed gas-burners for heating the water and causing it to circulate.

Laundry tubs are made of soapstone, cement stone, galvanized iron, etc. White crockery or ceramic ware is considered the best and most expensive material for this use. Slop-sinks and slop-hoppers are well enough made of any of the common materials, but they should be regularly flushed and cleaned with soap and hot water,—a rule which is too frequently honored in the breach. There are few conveniences on the market for keeping them wholesome.

So much attention has been given to water-closet construction that almost all the bad and unscientific devices have been driven out, and the common form of bowls, cisterns and traps are entirely requisite for the purpose, if kept in order. Traps are made in innumerable forms. They are best made to com-

bine both a mechanical and a water seal, or with a double seal, as in the siphon closet. Here the lower part of the bowl becomes a water-seal and the trap below contains another. When a flood of water is supplied from the cistern, the upper water forces the air in the space between the traps through the water of the lower trap, thus establishing a siphoning action which assists in drawing off the contents of the bowl. It is very common to unite the crockery bowl of the closet with the floor, by allowing the lower end of the trap to project into the pipe, or by means of flush-connections. Both methods are bad. While the former cannot leak water, it is very apt to leak sewer-gas. The best method, now coming into use, is to allow the end of the soil-pipe to project above the floor and into the trap. Then if the joint ever leaks it will be water that comes out, and the leak will be detected at once, and can be repaired.

The chain-pull cistern for closets commands the market, though for public places the seat-depression flow is often preferred, or the automatic flushing at regular intervals. The ordinary cistern has a float-valve, which closes the inflow-hole in the water-pipe as soon as the cistern is full. It is not considered safe to flush direct from the water-supply pipes, as there may be occasional low head in the pipes, allowing foul air to get in and contaminate the drinking-water. The automatic flushing is performed by a gravity apparatus, in which there is a bowl supplied with a small stream of water. If it is set to flush every half-minute, at the end of that time the water in the bowl gives it sufficient weight to overturn, throwing its contents down the pipe for a flush. At the same time a similar bowl, mounted opposite to the one overturned, takes its place under the stream of water until it is filled, and, overturning, brings the first bowl into place again. Good ventilation should always be provided for closets. If they cannot have outer windows, then an air-shaft should be placed contiguous to them. Where the climate admits, they are best placed beyond the outer walls of the house. Basement closets are objectionable, as all accidents in the way of leaking sewer-gas contaminate the whole house, and because they are most liable to get out of order, and remain so for want of inspection by competent persons, they being usually left wholly to the care of domestics.

The ventilation of dwellings is much neglected. It is usually supposed that the chimney-flues and the windows will afford all the air required. Fresh air without draft is what should be provided, and what not one dwelling in a hundred is designed to furnish its occupants. A perforated panel below a window, with numerous minute holes, is a good method of admitting air without noticeable draft. A hole in the chimney-flue, with a shutter to cut off any down-blow of smoke, is another simple device more commonly employed. Chowne's siphon ventilating system is used by some architects, especially in large buildings, where these matters receive more attention. It is based on the principle that an upright J-shaped tube always gives the air a tendency to rise in the longer leg, and to fall in the shorter leg. By making use of some ornament for the

short tube, and utilizing flues for the long tube, convenient ventilation may be obtained without any visible appliances.

C. H. COCHRANE.

SAN JACINTO, BATTLE OF. See HOUSTON, Vol. XII, p. 318.

SAN JOAQUIN RIVER AND VALLEY. See CALIFORNIA, Vol. IV, pp. 696, 697; and STOCKTON, Vol. XXII, p. 560.

SAN JOSÉ, the capital of Santa Clara County, California, on several branches of the Southern Pacific railroad. The city is noted for its rapid growth, delightful climate and charming surroundings, made up of gardens and orchards, evidencing the high degree of culture possible, as also the care and taste whereby such luxuriant growth and development is attained. It contained, in 1894, six state banks with a combined capital of \$1,590,000, a national bank with capital of \$500,000, numerous churches, a state normal school, and the Academy of Notre Dame, the State Asylum for the Chronic Insane, a United States government building, and the first electric tower erected in America, constructed of iron and two hundred feet in height. Two daily and seven weekly papers and three monthly periodicals are published, and the hotels furnish abundant accommodation for a large number of guests. Iron foundries, machine-shops, tanneries, flour and saw mills, and other branches of manufactures are successfully operated, and fruit is extensively canned and shipped. Population 1870, 9,089; 1880, 12,567; 1890, 18,060. See also SAN JOSÉ, Vol. XXI, p. 266.

SAN JOSÉ, the capital of Costa Rica, Central America. See SAN JOSÉ, Vol. XXI, p. 266.

SAN JOSÉ OR SAN JOSÉ DE GUATEMALA, a town and port of Guatemala, 58 miles S.S.W. of the city of Guatemala, with which it is connected by rail. It has only an open roadstead, with an iron pier running out past the surf, and vessels load and discharge by lighters. A very considerable trade is carried on, the yearly imports amounting to about one million two hundred and fifty thousand dollars. Population, about 2,000.

SAN JUAN, a western province of the Argentine Republic, between lat. 30° and 32° S. and long. 68° and 70° W., bounded on the west by Chile, on the north, south and east by the provinces of Rioja, San Luis and Mendoza; has an area of about thirty thousand square miles; surface varied by mountains and large sandy plains; the principal rivers, the San Juan, Jachal and Bermejo; rich in minerals, having gold, silver and copper, and deposits of coal, but the mining industry is undeveloped. The province is almost entirely devoted to agriculture, which, owing to the dryness of the climate, is carried on principally along the rivers, where irrigation is made use of. The chief productions are corn, wheat, lucerne, fruit and grapes. Large quantities of a very fine wine are made. The province, in 1889, had but one railroad. Population 1895, 84,251. The capital, San Juan, partially destroyed by an earthquake in 1894, had a population of 10,400 in 1895. For the location of the town, see SAN JUAN, Vol. XXI, p. 266.

SAN JUAN ARCHIPELAGO. See **SAN JUAN ISLANDS**, Vol. XXI, p. 266.

SAN JUAN BAUTISTA, a town of **PORTO RICO**; q.v., Vol. XIX, p. 532.

SAN JUAN DEL NORTE. See **GREYTOWN**, Vol. XI, p. 194.

SAN JUAN DEL SUR, a port of southwestern Nicaragua, on the Pacific Ocean, 24 miles S.W. of the city of Nicaragua, at the point where the coast is nearest to Lake Nicaragua. It has a good harbor, was formerly the terminus of the Central American Transit Route, and has the only cable station on the Pacific side of the state. A short distance north of the town the proposed Nicaragua canal will terminate.

SAN JUAN RIVER. See **NICARAGUA**, Vol. XVII, pp. 477, 478.

SANKEY, IRA DAVID, an American evangelist; born in Edinburg, Lawrence County, Pennsylvania,



IRA D. SANKEY.

Aug. 28, 1840. He very early in life evinced great fondness for music, and became the leader of the church choir in Newcastle, Pennsylvania. His habits and inclinations were entirely religious, and he was prominent in the Young Men's Christian Association in the town; went to Indianapolis in 1870 as a delegate to some convention, and it was there he first met Dwight L.

Moody. From that time they worked together for years, Sankey's singing being a great auxiliary to Moody's evangelical work. Mr. Sankey gave the Young Men's Christian Association of Newcastle a fully equipped building, reading-rooms, gymnasium, etc., and also a building-lot to the Methodist Church Society, with which he united when only 15 years of age. He had a fine baritone voice, and was very successful with his audiences. His published volume of *Sacred Songs and Solos* had a very wide circulation.

SANKHYA, a system of Hindu philosophy. See **SANSKRIT**, Vol. XXI, pp. 290, 291.

SAN LAZZARO. See **MECHITHARISTS**, Vol. XV, p. 774.

SAN LEANDRO, a town of Alameda County, western California, on the Southern Pacific railroad, 16 miles E. of San Francisco. It is the center of a fertile agricultural and fruit-raising district, and has manufactures of hardware and farm implements. Population 1890, 1,879; 1894 (estimated), 2,800.

SAN LUCAS, a cape at the southern extremity of Lower California, Mexico; lat. 22° 44' N., long. 109° 54' W.

SAN LUIS, a province of central Argentine Republic; area, about 18,000 square miles; surrounded by the provinces of Mendoza, La Rioja, Cordova and San Juan, and the territory La Pampa; watered by the Rio Quinto and Desaguadero, and intersected by the Andean and the Pacific railways. The surface varies from mountainous in the north to the

arid pampas in the south. Agriculture is carried on by irrigation, the principal products being corn, lucerne and wheat. Cattle are raised, and extensively shipped to Chile and Buenos Ayres. Mining is the principal industry, the mountains being rich in gold, copper, iron and lead. Plumbago, sulphur, salt and porcelain-clay are also found. The province had a population in 1892 of about one hundred thousand. The capital and chief town of the province, San Luis de La Punta, is situated 445 miles N.W. of Buenos Ayres, on a river which falls into the large salt lake of Bevedero, and on the railroad running from Buenos Ayres to Chile. It has some trade in horses, hides and furs. Population 1892, about 8,000.

SAN LUIS OBISPO, a city and the capital of San Luis Obispo County, southwestern California, on the Pacific Coast and the Southern Pacific railroads, about 90 miles N.W. of Santa Barbara, and eight miles from the Pacific Ocean. It is the trade center of a rich mining, agricultural and grazing district. Bituminous rock is extensively quarried for paving purposes. Population 1890, 2,995.

SAN MARCOS, a town and the capital of Hays County, southeastern central Texas, on the San Marcos River, and on the Missouri, Kansas and Texas and the International and Great Northern railroads, about 31 miles S.S.W. of Austin. It is the center of a section devoted to raising corn, cotton and cattle. It is the seat of Coronal Institute, founded in 1879 by the Methodist Episcopal Church South; has the grounds of the Texas Chautauqua Association; a United States fish-culture station; several gin-houses and cottonseed-oilmills. A group of boiling springs are found here. Population 1890, 2,335.

SAN MIGUEL, a town and the capital of a department of the same name, eastern Salvador, on the San Miguel River, about 70 miles E.S.E. of San Salvador. It has a warm and unhealthy climate; is the center of a rich agricultural region, and produce a large quantities of indigo. Here are held the most important fairs of Salvador, when it is said fifteen thousand strangers visit the town. About nine and one half miles to the westward is the volcano of San Miguel, one of the most active in Salvador, having an altitude of about six thousand feet. Population, about 12,000.

SAN MIGUEL DE ALLENDE, a town in the state of Guanajuato, central Mexico, situated on the Mexican National railroad, 34 miles N. of Ceyala. Has a telegraph-station, dominion express and a college. Population, 15,000.

SAN RAFAEL, a town and the capital of Marin County, western California, about 15 miles N. of San Francisco, on San Pablo Strait, and on the North Pacific Coast and the San Francisco and North Pacific railroads. It is situated in a farming, dairying and stock-raising country, and is a well-known resort for invalids. Hourly communication may be had with San Francisco by rail and ferry. San Rafael Institute, opened in 1881, and St. Vincent's Male Orphan Asylum, are located here. Population 1890, 3,290.

SAN SABA, a town and the capital of a county of

the same name, central Texas, on the San Saba River. Its railroad station is Lometa, on the Gulf, Colorado and Santa Fé railroad. The surrounding country is devoted to farming and stock-raising. Population 1890, 697.

SAN SALVADOR, a city and the capital of the Central American republic of Salvador, is situated inland, on a small stream which empties into the Pacific Ocean, 105 miles S.E. of Guatemala, 36 miles by carriage-road from its port, La Libertad. It was founded in 1528, and in 1539 was removed to its present site. In 1854 it was a fine, well-built city, adorned with numerous splendid buildings, and containing a population of more than twenty-five thousand, but on the night of April 16th it was completely destroyed by an earthquake. The town of Nueva San Salvador was built 12 miles to the southwest, and thither the government removed until 1858. The population had reached forty thousand, when the city was again destroyed in 1873, and violent shocks of earthquake visited the capital in 1879 and 1891. As now built, the edifices of the city are low, and surrounded by wide grounds, and many public buildings, including the cathedral, are of wood. San Salvador is the center of a rich farming section, and enjoys a large trade. It has a national palace, a national theater, a university and a normal college. A railroad connecting the city with La Libertad is contemplated. Population 1892, about 20,000.

SAN SALVADOR ISLAND. See COLUMBUS, Vol. VI, p. 173.

SANT, JAMES, an English painter; born in Croydon, April 23, 1820. He received most of his instruction at the Royal Academy; was made a member of the Royal Academy in 1870, and in 1871 principal painter in ordinary to the Queen. Among his most widely known works are the *Infant Samuel*; *Little Red Riding-Hood*; *Dick Whittington*; *Retro-spection*; *Saxon Women*; and the *Miller's Daughter*. For the Countess of Waldegrave he painted 22 portraits of members of her circle, including the Duchess of Sutherland, Lady Constance Grosvenor, the Duchess of Wellington and Earl Grey. He was commissioned to paint a large portrait of the Queen and the three eldest children of the Prince of Wales and another portrait of the Queen for the Turkish embassy.

SANTA ANA, a city and the capital of Orange County, southern California, on the Southern Pacific and the Southern California and Santa Ana railroads, 33 miles S.E. of Los Angeles. It is in a fruit-growing district, and near by are large peat-beds. The industries include flour, planing, lumber and feed mills, soda-works, manufactures of hardware, bricks, cigars, incubators, etc. Population 1890, 3,628.

SANTA ANA, a city and the capital of the department of the same name, western Salvador, near the source of the Santa Ana River, connected by rail with the port of Acajutla, about 40 miles W.N.W. of San Salvador. It is one of the most important cities of Salvador, is the center of a rich agricultural region, and controls the sugar trade of the country. Iron, copper, silver and zinc mines are found in the vicinity. It is the seat of one of the state univer-

sities and of a college for girls. About eleven miles southwest of the city is the active volcano of Santa Ana or Lematepec, having an altitude of 6,614 feet. Population, about 22,000.

SANTA BARBARA, a city and the capital of Santa Barbara County, California, a seaport of the Pacific coast, and a health and pleasure resort of unexcelled attractions, about 90 miles W.N.W. of Los Angeles, on the Southern Pacific railroad, with regular steamer communication with San Pedro, San Diego and San Francisco. It has a delightful climate, is situated in a country of surpassing beauty, and protected by the mountains from the northern winds; vegetation of a tropical nature flourishes. The surrounding country has large interests in wool, stock-raising, olive-oil, petroleum, asphaltum and fruit-growing. The city contains three institutions of learning, planing and feed mills, machine-works and beet-sugar factories. The town is supplied with street-railway facilities, and is lighted by gas and electricity. Population 1890, 5,864.

SANTA CLARA, a thriving town of western California, charmingly situated in the fertile Santa Clara valley, in Santa Clara County, on the Southern Pacific railroad, about 3 miles W. of San José and 45 miles S. of San Francisco. The town has an extensive distillery and winery, a large tannery and manufactures of windmills. It is the seat of Santa Clara College, a Catholic institution, and of the University of the Pacific, at College Park, one mile from the town, a Methodist Episcopal institution established in 1851, and having, in 1894, 26 instructors, 286 students and a library of 3,980 volumes. Population 1890, 2,891.

SANTA CRUZ, a well-known watering-place on the Pacific coast, a city and the capital of Santa Cruz County, western California, situated on the north side of Monterey Bay, 70 miles by water S.E. of San Francisco. The city has communication with all points by the Southern Pacific and other railroads, also by coast steamship lines, and is otherwise provided with transportation accommodations and conveniences. Agriculture, stock-raising and fruit and vine growing are carried on extensively in the surrounding country, and vast quantities of bitumen, mined near the city, are shipped to all parts of the state for purposes of paving. There are manufactures of flour, lumber, leather, paper, powder, lime and foundry products. Population 1890, 5,596. The winter residents number about 20,000.

SANTA CRUZ, ANDRES DE. See PERU, Vol. XVIII, p. 678.

SANTA CRUZ DE SANTIAGO. See CANARY ISLANDS, Vol. IV, p. 799.

SANTA CRUZ ISLANDS. See NEW HEBRIDES, Vol. XVII, p. 395.

SANTA FÉ, the capital and largest city of the territory of New Mexico. (For general geographical and historical article, see SANTA FÉ, Vol. XXI, p. 296.) It is annually increasing and extending, and is an important military post. Within late years the old city of adobes has given place to a new city with all the modern appointments. It is the seat of Romona School, for Indian girls; Presbyterian Academy, established in 1881; St. Michael's College, a

Roman Catholic institution established in 1859, and having 12 instructors and 175 students in 1890; and the University of New Mexico, opened in 1881 under the denominational control of the Congregationalists, and having, in 1888, a corps of 10 instructors and 185 students. Population 1890, 6,185.

SANTA FÉ DE BOGOTÁ, a city of Colombia, more generally known as Bogota. Population 1886, about 120,000. See also BOGOTA, Vol. XXI, pp. 858, 859.

SANTALACEÆ. See PARASITISM, Vol. XVIII, p. 266.

SANTAL-WOOD OR SANDERS-WOOD. See SANDALWOOD, Vol. XXI, p. 255.

SANTA MARIA, DOMINGO, a South American jurist; born in Santiago, Chile, August 4, 1825; studied in the National Institute; became professor of geography and arithmetic there, in 1845; studied law; entered politics; was exiled (1850-52 and 1858-62); became Minister of the Treasury (1863-64); judge of the supreme court (1867); held other high offices; and in 1881 was elected President of the republic, serving five years with ability. He then became again president of the court of appeals. He published historical works relating to his native country.

SANTA MARIA DI CAPUA. See CAPUA, Vol. V, p. 79.

SANTA MARTA, a seaport town and the capital of the department of Magdalena, Colombia, about 40 miles E. of the Magdalena River, on a bay of the Caribbean Sea. It was said to have been founded in 1525, and in its early days was the scene of many conflicts, having been repeatedly attacked by Indians, and captured and plundered by English and French pirates. The town is connected with Cienaga by a railway, which in 1895 was being extended to the Magdalena River. It is an episcopal see, and has a large cathedral. Population, about 6,000. A short distance to the southeast are the Santa Marta Mountains, a remarkable isolated group, completely separated from the Andean system, and of an entirely different geological structure. The highest peak rises to a height of over 17,000 feet above the sea-level.

SANTA MONICA, a city and seaport of Los Angeles County, southwestern California, on Santa Monica Bay, and on the Southern California and Southern Pacific railroads, 17 miles W. of Los Angeles. It is well known as a watering-place, and has interests in ostrich-farming, lumbering and milling. The harbor, in which a considerable trade in shipping is carried on, has a wharf extending 4,700 feet into the bay, making it one of the longest ocean wharves in the world. The Pacific branch of the National Home for Disabled Volunteer Soldiers is located here. Population 1890, 1,580. North of the city are the Santa Monica Mountains, a short range with an east and west trend, remarkable as being made up of Miocene stratified rock, and having a central well-defined linear axial mass of intrusive granite driven through it like a wedge.

SANTANDER, FRANCISCO DE PAULA (1792-1840), a patriot-soldier, lieutenant to Bolivar; refugee from 1828 to 1831; President of New Gra-

nada from 1832 to 1837. See also BOLIVAR, Vol. IV, pp. 8, 9.

SANTA PAULA, a town of Ventura County, southern California, on the Southern Pacific railroad, 16 miles N. of San Buenaventura and about 50 miles N.W. of Los Angeles. It is the center of a rich agricultural region, in the Santa Clara valley; has a semi-tropical climate, and is noted as a health-resort. In the vicinity are the largest bean-fields in the country, extensive orange and lemon groves, and important interests devoted to the honey industry. The surrounding mountains are rich in petroleum, asphaltum, timber and building-stone. The principal industries of the town are oil-refining, shipping of stone and asphaltum, and the manufacture of printing-inks. Population 1890, 1,047.

SANTAREM, MANUEL FRANCISCO DE BARROS E SOUSA (1791-1856), a courtier, and lived 23 years in Paris. See PORTUGAL, Vol. XIX, p. 558.

SANTA ROSA, a manufacturing city and the capital of Sonoma County, western California, delightfully situated in a fertile valley, at the base of the Coast Range, about 50 miles N. of San Francisco, on the San Francisco and North Pacific and the Southern Pacific railroads. It is the seat of the Christian College and the Pacific Methodist College. The city takes its name from the roses, which bloom here all the year, and is in the richest wine-growing region in the state, a section also devoted to agriculture, stock-raising and dairying. The principal industries are the manufacture of wine, flour, and leather, and the canning of fruit. Population 1890, 5,220.

SANTA ROSALIA, a city of southern Chihuahua, on the Nonoava River, near its junction with the Conchos, and on the Mexican Central railroad, about 300 miles S. of El Paso and 90 miles S.E. of Chihuahua. The city is an important trade center, and is a noted resort for sufferers from rheumatic affections, who find relief in the hot sulphur springs in the vicinity. Population, estimated at 8,000.

SANTEE RIVER, a stream formed by the union of the Congaree and Wateree rivers, about 35 miles S. of Camden, South Carolina. It follows a winding course in a southeasterly direction, and before reaching the Atlantic divides into the North and South Santee. It is navigable throughout its course, a distance of about 150 miles, and for a part of the distance flows through pine forests and rice-lands.

SANTI, GIOVANNI, a painter. See RAPHAEL, Vol. XX, p. 274.

SANTIAGO, the capital of Chile. Population 1885, 189,300; 1894 (estimated), 225,000. See SANTIAGO, Vol. XXI, pp. 298, 299.

SANTIAGO DE LOS CABALLEROS, a town in northern Santo Domingo, on the Yaqui River, at the foot of the southern slope of the Sierra de Monte Cristi, about 85 miles N.N.W. of Santo Domingo. It is situated in a fertile region, has a healthful climate, free from the heat and fevers of the coast, and carries on an important trade, principally in tobacco. Estimated population, 10,000.

SANTO DOMINGO, REPUBLIC OF. See HAYTI, Vol. XI, pp. 543-546; and HAYTI, in these Supplements.

SANTONIN, a white crystalline substance obtained from *Santonica* (German or Levantic worm-seed). It is anthelmintic in doses of from one to four grains (.05 to .25 grams.). Sometimes it exerts a peculiar effect on the sight, everything looking as if seen through a yellow glass. Large doses are poisonous.

SANTORIN, an island. Same as THERA, Vol. XXIII, p. 279.

SÃO FRANCISCO RIVER. See BRAZIL, Vol. IV, p. 222.

SAÔNE, a river. See RHONE, Vol. XX, p. 528.

SAP. See *Absorption*, under PHYSIOLOGY, Vol. XIX, pp. 44-46.

SAPAJOU. See APE, Vol. II, pp. 153, 154.

SAPAN-WOOD. See SAPPAN-WOOD, Vol. XXI, p. 302.

SAPODILLA, the common name of the delicious fruit of *Achras Sapota*, a West Indian tree of the family *Sapotaceæ*.

SAPONIFICATION. See OILS, Vol. XVII, pp. 740, 741.

SAPONIN. See SOAP-BARK, Vol. XXII, p. 204.

SAPOTACEÆ, a small family of shrubs and trees containing about four hundred tropical species, commonly known as the Sapodilla family. Some genera have excessively hard wood, known as iron-wood (*Sideroxylon* and *Bumelia*). The latex of some genera (*Palaquium*, *Mimusops* and *Payenia*) is the raw material of gutta-percha. Several genera bear highly prized berry-like fruits, as sapodilla and star-apple, and the seeds of *Bassia* yield an abundant fatty oil.

SAPPERS. See FORTIFICATION, Vol. IX, p. 456.

SAPROPHYTES, a name given to plants without chlorophyll, which obtain their food from decaying organic material, or from the products of living organisms. Among saprophytes are the well-known mushrooms and toadstools. See also BIOLOGY, Vol. III, p. 691; and BACTERIOLOGY, in these Supplements.

SAP-SUCKER (*Sphyrapicus varius*), a North American bird of the woodpecker family (*Picidæ*), often called the yellow-breasted woodpecker. Like other members of the family, it bores holes in trees; but, unlike the others, this bird is said not to be in search of insect-larvæ, but the sap, which constitutes its food. Some authorities claim that the bird seeks insect-larvæ as well as sap. Sometimes fruit and ornamental trees, especially maple, are injured by the numerous punctures made by this bird.

SAPWOOD. See BOTANY, Vol. IV, p. 100.

SARACENIC ART. See ARCHITECTURE, Vol. II, pp. 445-448.

SARAGOSSA. See ZARAGOSA, Vol. XXIV, p. 769.

SARAGOSSA, MAID OF. See AGUSTINA, in these Supplements.

SARAJEVO. See BOSNA SERAI, Vol. IV, p. 68.

SARAKHS. See PERSIA, Vol. XVIII, p. 618.

SARANAC LAKE, a village of Franklin County, northeastern New York, on the Chateaugay, New York Central and Hudson River, and Saranac and Lake Placid railroads, 40 miles S. of Malone and

about 60 miles S.W. of Plattsburg. It is best known as the center of one of the most beautiful regions in the Adirondack Mountains. Three lakes, the Upper, Middle and Lower Saranac lakes, lie near the village, making it a most delightful summer resort. The Adirondack Sanatorium, an institution much visited by persons suffering from pulmonary complaints, is located here. Population 1890, 768.

SARASATE, MARTIN MELITON, a Spanish violinist; born in Pampeluna, March 10, 1844. He entered the Paris Conservatoire in January, 1856, and gained the first prizes for solfeggio and violin. He then entered Reber's harmony class and secured a *premier accessit* in 1859, but shortly after relinquished the study of composition for the career of a concert player. His performances were highly successful. He has played in nearly all the great towns between Portugal and Norway, and London and Moscow, and visited America, North and South, in 1890 and 1894.

SARASWATI. See ALLAHABAD, Vol. I, p. 579.

SARATOGA, BATTLE OF. See UNITED STATES, Vol. XXIII, p. 742; and SARATOGA SPRINGS, in these Supplements.

SARATOGA SPRINGS, a popular inland watering-place of New York state, which has changed little since the account contained under SARATOGA SPRINGS, Vol. XXI, p. 306, was written. It has grown, if anything, more beautiful; its shaded avenues are grander, and the houses of its rich visitants more numerous. With the suppression of its gambling-houses and the cessation of horse-racing, its popularity has, if anything, increased. It is essentially the city of conventions for all learned and prominent societies. Saratoga Lake, distant five miles from the town, has been connected with it by an electric surface railroad, and the lake has become a popular meeting-place for rowing-crews in an annual regatta. The mineral springs described under MINERAL WATERS, Vol. XVI, p. 436, are, if anything, more numerous, and in greater popular favor. It would seem impossible to sink a shaft in the vicinity of Saratoga Springs without discovering some new mineral water, differing slightly in analysis from those already in popular favor. The prevailing character of the waters is cathartic.

Sixteen miles distant, at Schuylerville and Bemis Heights, reached by railroad, driving, or by fine roads for bicycling, rises a magnificent monument in memory of Burgoyne's surrender after the battles of Saratoga. These conflicts took place Sept. 19, Oct. 7, and Oct. 17, 1777. Burgoyne, with his army, was trying to effect a junction with the royalist forces from New York. He crossed the Hudson and attempted to storm the strong American position held by Gates at Bemis Heights. The battle was sanguinary, both British and Americans losing a fourth of the men in action. Then for 18 days nothing was done. News came to Burgoyne that his supplies were cut off. He was forced to again attack the strong position of the American army, though he had but 4,000 men as opposed to 16,000. With 1,500 picked men under Fraser he tried to turn the American flank, and for the second time Benedict Arnold thwarted his plans. Both Fraser

and Arnold were wounded and disabled. On October 17th, Gates, with 20,000 men, followed the retreating army, who found their passage across the Hudson cut off. Burgoyne was unable to hear from Clinton, and accordingly treated with a view to surrender. The terms agreed upon, called the "Convention of Saratoga," permitted the British to march out with the honors of war, lay down their



SARATOGA MONUMENT.

arms, march to Boston, embark for England and not serve against Americans again. The British forces marched out on October 17th, but the terms of the convention were not sanctioned by Congress, and while the officers were paroled the men were kept prisoners for a considerable period. The scene of the battle-ground, with its handsome monument, is a place of popular excursion from Saratoga and surrounding places. Population 1890, 11,975.

SARCEY, FRANCISQUE, a French dramatic critic and novelist; born in Dourdan, Oct. 8, 1828; educated at the normal school; first wrote for the *Figaro* and the *Revue Européenne*; in 1859 accepted the post of dramatic critic to the newly-founded *Opinion Nationale*, and in 1867 accepted a similar post on the *Temps*. His most important work is his dramatic criticism, but he has published several novels, a *History of the Siege of Paris*; *Comédiens et Comédiennes* (two series, 1876 and 1884); two volumes of reminiscences, *Souvenirs of My Youth* (1885) and *Souvenirs of My Age* (1892); and *The Theatre* (1893).

SARCOZINE, methyl-amido-acetic acid, obtained by splitting up creatine, or creatinine, or from methylamine and chloroacetic acid. It forms rhombic prisms, soluble in water, little soluble in alcohol. It has a sweet taste, and melts at 210° to 215° , with partial decomposition. Taken internally, most of it passes through the system unchanged.

SARDINIA, a former kingdom. By the treaty

of Utrecht the house of Savoy added to their extensive possessions the principality of Montferrat and the island kingdom of Sicily. At this time Sardinia was subject to Austria, and in 1720 the latter exchanged Sardinia for Sicily. The title of king, which had gone with Sicily, was, however, retained by the Duke of Savoy and attached to Sardinia. A new kingdom of Sardinia thus came into existence. In 1831 the direct male line of the house of Savoy became extinct, the crown falling to Charles Albert (1831-49), the head of the branch Savoy-Carignano, founded by a younger son of Charles Emmanuel, Thomas Francis, born in 1596. King Charles abdicated his throne March 23, 1849, in favor of his son, Victor Emmanuel II. By the peace of Zurich, Sardinia obtained Lombardy, with the exception of Mantua, part of the papal states and the duchies of Parma and Modena. In 1860 Parma, Modena, the Romagna, Tuscany, Sicily, Naples, Marche and Umbria joined Sardinia. In this year Savoy and Nice were ceded to France. March 17, 1861, Victor Emmanuel was declared king of Italy. The remaining part of Lombardy and Venetia was added in 1866, and the papal states (Province of Rome) were taken possession of Sept. 20, 1870, and annexed. For the merging of Sardinia into the kingdom of Italy, see ITALY, Vol. XIII, pp. 488-490; and SAVOY, Vol. XXI, p. 342.

SARDOU, VICTORIEN, a French dramatist; born in Paris, Sept. 7, 1831. He first studied medicine, but early took to the writing of plays. His first comedy (1854) proved a failure, but he continued dramatic composition, and quickly built up for himself a brilliant reputation. M. Sardou's earlier pieces were *Les Premières Armes de Figaro* (1859); *Monsieur Garat* (1860); and *Les Prés-Saint-Gervais* (1862).



VICTORIEN SARDOU.

M. Sardou afterward produced a large number of dramatic pieces in rapid succession, which admirably suit the taste of his play-going audiences. Subjoined is a list of his other works, with the dates of their first representation: *Les Gens Nerveux* (1859); *Les Pattes de Mouche* (1860); *Nos Intimes*, one of his most brilliant successes (1861); *La Perle Noire* (1862); *Les Diables Noirs* (1863); *Don Quichotte* (1864); *Les Vieux Garçons* (1865); *Maison Neuve* (1866); *Seraphine*, originally entitled *La Dévote* (1868); *Patrie* (1869), an historical play; *Fernande* (1870); *Rabagas* (1872), a play which was supposed to have reference to M. Gambetta; *Les Merveilleuses* (1873); *L'Oncle Sam* (1873), a satire on American society; *La Haine* (1874), a tragedy which was not successful; *Ferréol* (1875); *Dora* (1877), a comedy in five acts; and *Les Bourgeois de Pontarcy* (1878); *Daniel Rochat* (1880), a five-act comedy; *Odette* (1881), a play in four acts; *Divorçons* (1881), a comedy in three acts; *Fédora*, *Théodora* and *La Tosca* (1887), the last three being written for Madame Sarah Bernhardt,

and produced with great success in the United States by Fanny Davenport. His *Thermidor*, based on the French Revolution, was produced in 1891, but prohibited by the government. His *Gismonda* was produced by Bernhardt, at Paris, in 1894. He was decorated with the Legion of Honor in 1863, and elected a member of the French Academy in June, 1877. Sardou's comedies are rapid in action and full of witty dialogue, while they are for the most part improbable, and are thin and superficial in their emotional elements. He is amusing in his hits at his contemporary men of letters. His *Woman of Silence*, an improbable blackmailing story, was acted in London in 1894, and *Madame Sans-Gêne*, turning on the early love of Marshal Lefebvre, in New York, in 1895.

SARGENT, AARON AUGUSTUS, an American lawyer and public man; born in Newburyport, Massachusetts, Sept. 28, 1827. He was successively a printer and a reporter, going to California in 1849, where he made mining incidental to the labor of conducting the *Nevada Journal*, which he established there. He studied law, and in 1856 was elected district attorney of Nevada County. He was a Republican in politics, and in 1860 was sent to Congress, and immediately on the expiration of his term took his seat in the United States Senate. He was the author of the first Pacific Railroad act that passed Congress. Senator Sargent was, in 1882, appointed minister to Germany, but when the German authorities excluded American pork from the empire he resigned. He was later offered a Russian mission by President Arthur, but declined it. He died in San Francisco, California, Aug. 14, 1887.

SARGENT, CHARLES SPRAGUE, an American botanist; born in Boston, Massachusetts, April 24, 1841. After graduating he served as a volunteer staff-officer in the Union army, and afterward was appointed a director of the botanic garden and later of the arboretum of Harvard University, and professor of arboriculture. For the tenth census of the United States Professor Sargent made a special report on the forests of North America, which was published in full. He was also chairman of a committee to investigate the Adirondack forests and to devise means for their preservation.

SARGENT, EFES, an American journalist and poet; born in Gloucester, Massachusetts, Sept. 27, 1813. He became a student at Harvard University, paying particular attention to the study of *belles-lettres*. Subsequently he was occupied in editing and publishing the *Boston Daily Advertiser* and *Boston Atlas*, but in 1839 removed to New York City, where he occupied an editorial position upon *The Mirror*, and for several years officiated in a similar capacity upon the *Boston Evening Transcript*. On retiring from the latter position he edited a series of elementary school-books and wrote a number of dramas, among which was the *Bride of Genoa*, produced in 1836, followed by the *Priestess; Velasco* (1837); also wrote numerous songs, the best known of which is *Life on the Ocean Wave*. Probably his best works are *Life of*

Henry Clay (1842) and *Songs of the Sea* (1847). He died in Boston, Dec. 31, 1880.

SARGENT, JOHN SINGER, an American painter; born in Florence, Italy, of American parents, in 1856. He studied under Carolus Duran in Paris; received a second-class medal at the Salon of 1881; a medal of honor at the Paris Exposition of 1889; and the cross of the Legion of Honor the same year. He was very strong in portrait painting, and painted personages in Paris, London, New York and Boston. He was a member of numerous art societies; lived in London after 1885. His painting *La Carmencita* was purchased by the French Government in 1892.



JOHN S. SARGENT.

SARGENT, WINTHROP, an American soldier; born in Gloucester, Massachusetts, May 1, 1753. He was a sea-captain till 1776, when he joined the army, serving through the Revolution; was successively purveyor-general, secretary and governor, from 1798 to 1801, of the Northwest Territory; was in St. Clair's and Wayne's Indian expeditions; was a member of the American Society of the Arts and Sciences, and several other bodies, and aided Benjamin S. Smith in preparing *Papers Relative to Certain American Antiquities*. He was governor of the territory of Mississippi in 1790 and 1791, and died in New Orleans, June 3, 1820.—His grandson, WINTHROP SARGENT, author; born in Philadelphia, Pennsylvania, Sept. 23, 1825. He edited *The History of Braddock's Expedition Against Du Quesne* (1855) and *Loyalist Poetry of the Revolution*; and wrote *The Life and Career of Major John André*. He died in Paris, France, May 18, 1870.

SARGON, KING. See BABYLONIA, Vol. III, p. 187.

SARMIENTO, DOMINGO FAUSTINA (1811–1888), President of the Argentine Republic. See ARGENTINE REPUBLIC, Vol. II, pp. 492, 495.

SARMIENTO DE GAMBOA, PEDRO. (1530–1589.) See PATAGONIA, Vol. XVIII, p. 353.

SARNIA, a city and port of entry, and the capital of Lambton County, southwestern Ontario, Canada, on the St. Clair River opposite Port Huron, with which it is connected by ferry, and on the Grand Trunk and the Erie and Huron railways, at the Canadian end of the tunnel under the St. Clair River, about 60 miles W. of London. It is situated in a region having important lumber, petroleum and agricultural interests. The principal industries of the city are woolen and planing mills, foundries, machine-shops, breweries, tanneries, etc. Sarnia is a stopping-place for vessels bound for the northern lakes, and has a large shipping-trade. Point Edward, formerly Port Sarnia, is now within the city limits. Population 1891, 6,693.

